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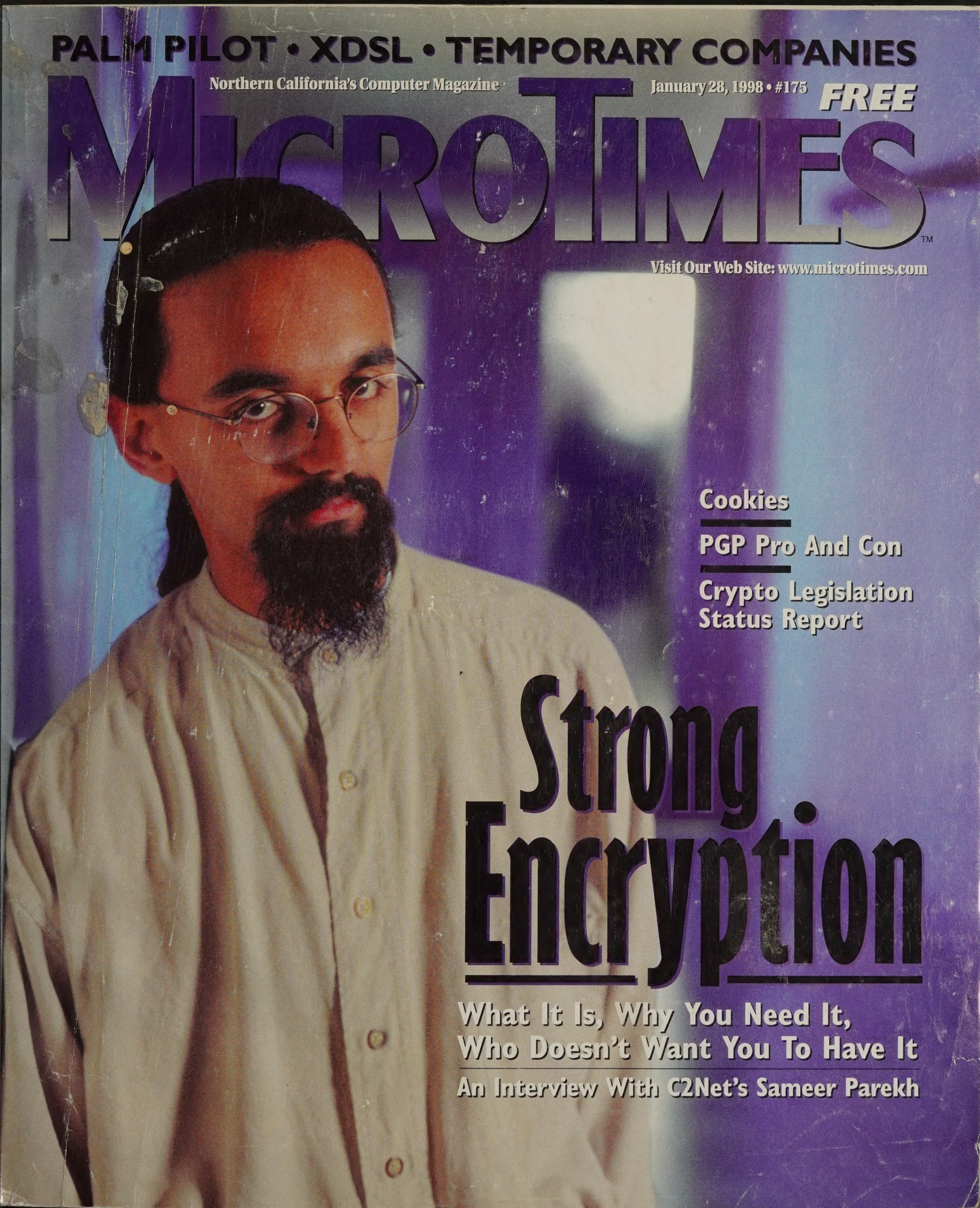

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Ergonomic 104-key keyboard
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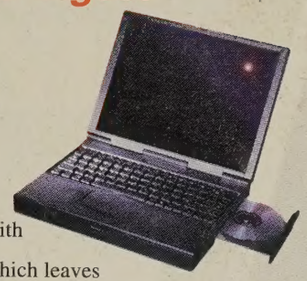

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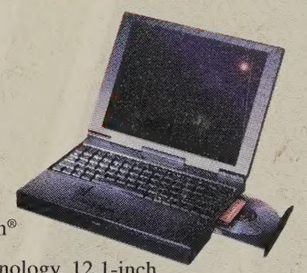
NSTL PC Digest, September 1997

Best Buy - *PC Portables*



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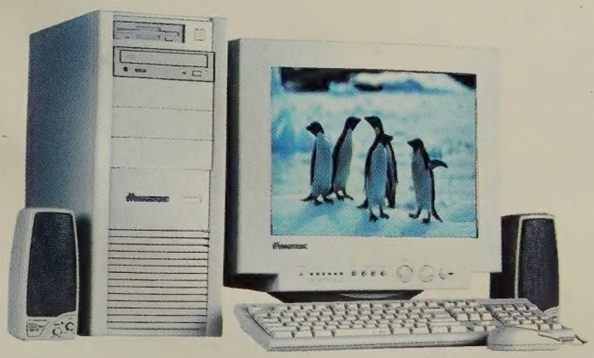

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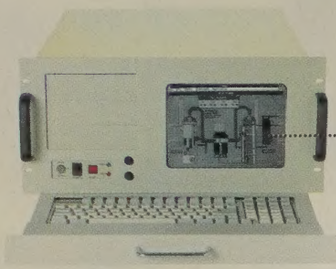

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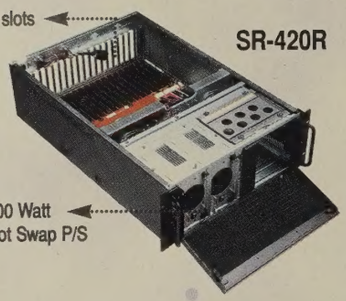

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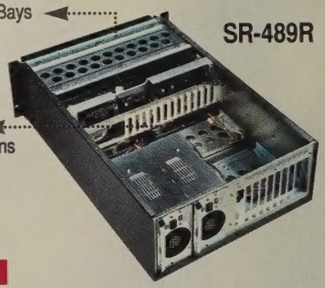

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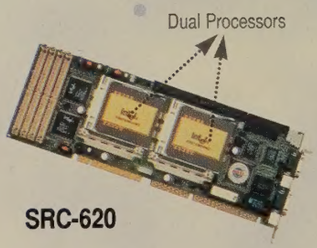

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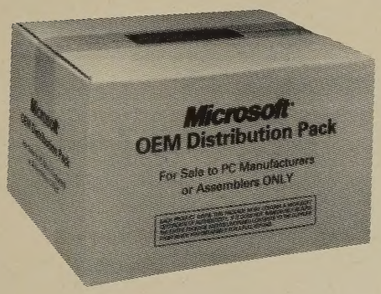

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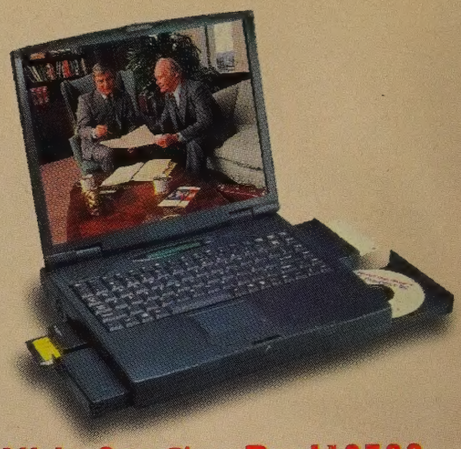

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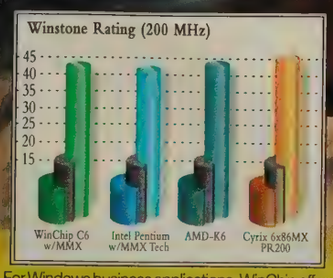

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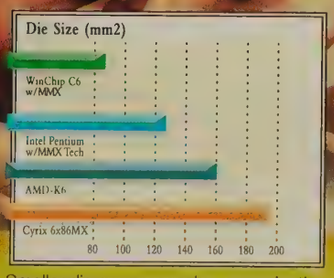

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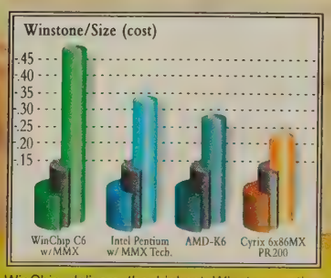

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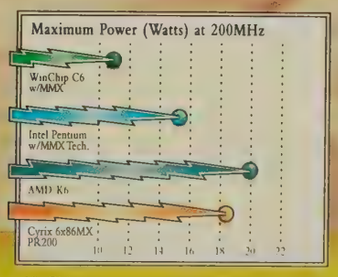

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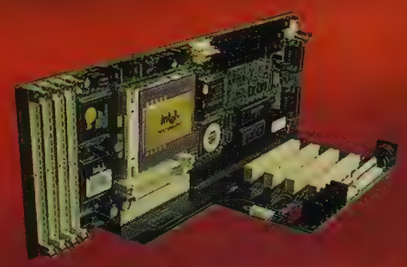

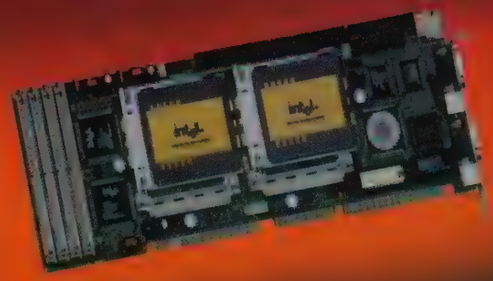

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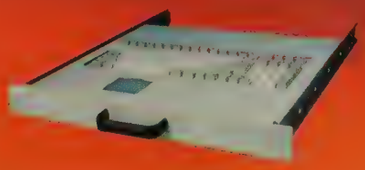

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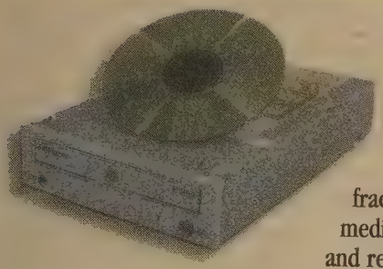

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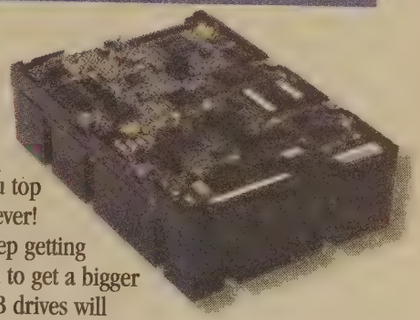

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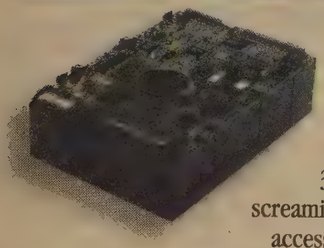

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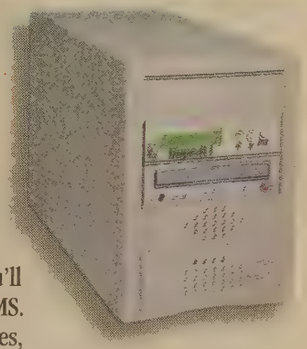

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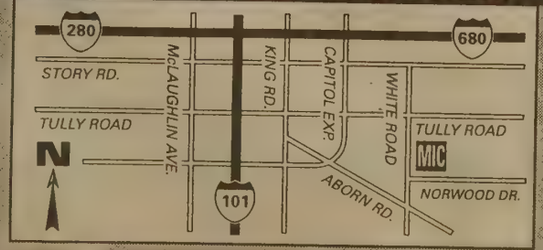

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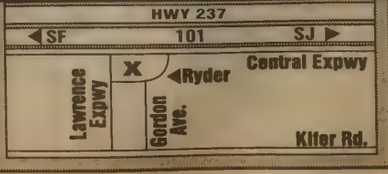

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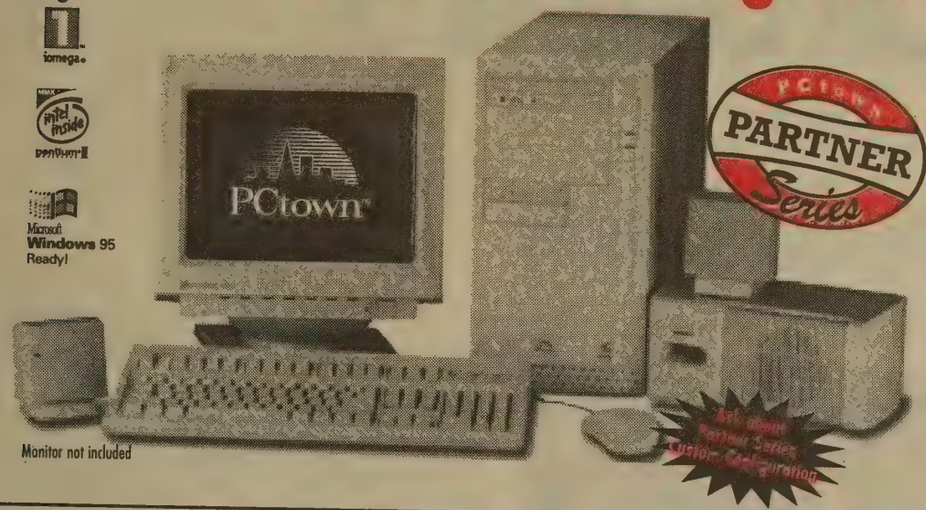

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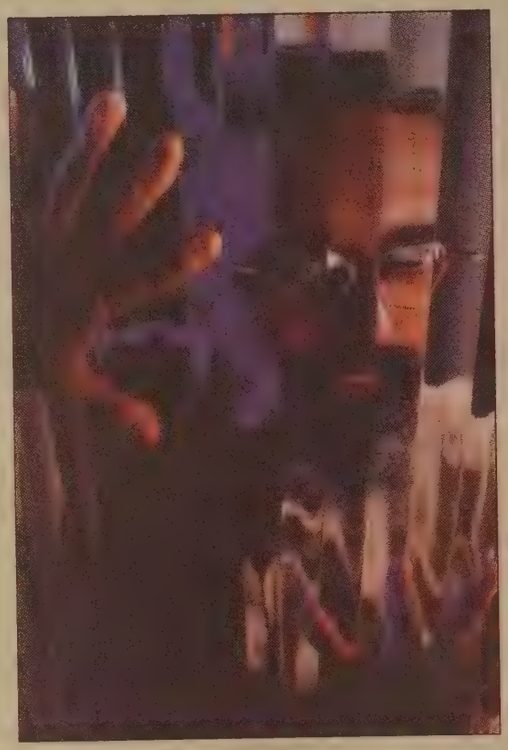

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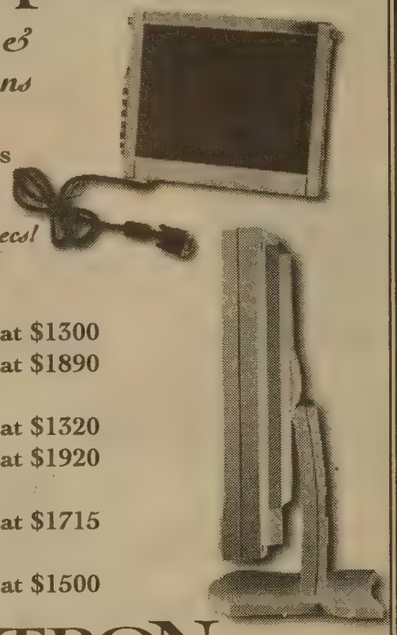

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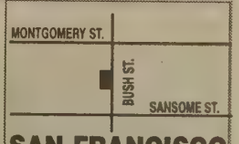

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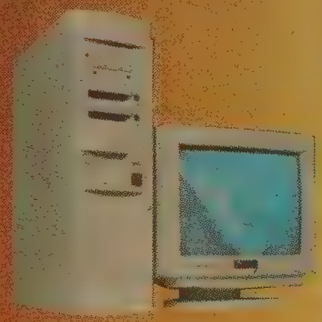

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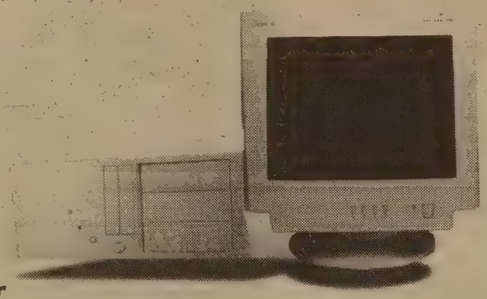

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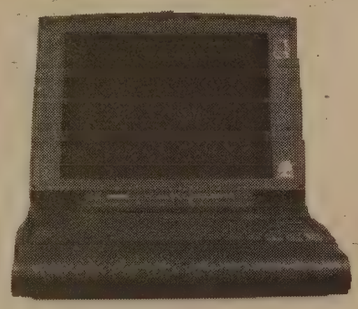

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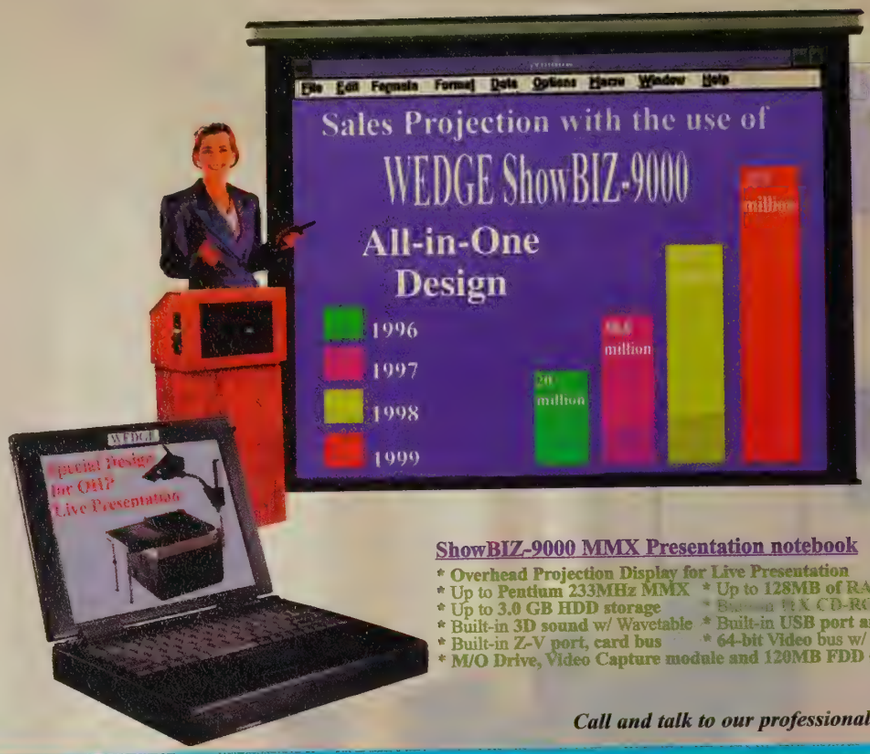

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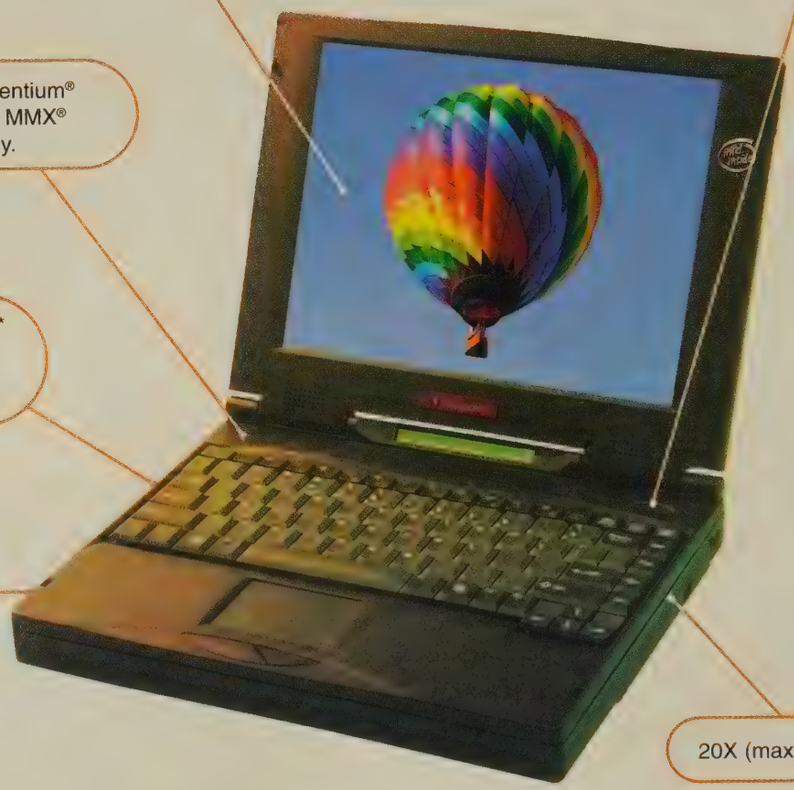

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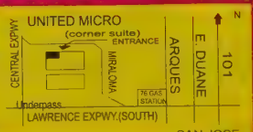

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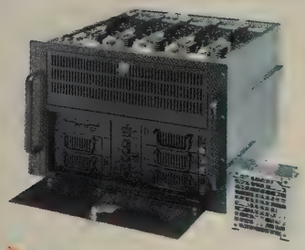

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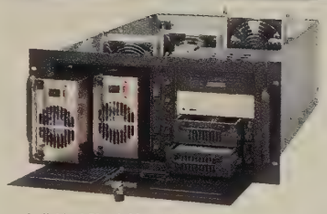

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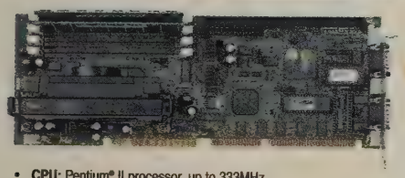
RAID

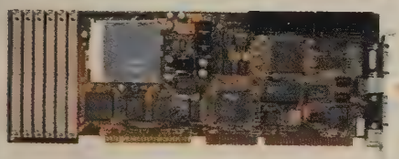
SBC - Pentium® II



NEW

- **CPU:** Pentium® II processor, up to 333MHz
- **Cache:** 512K Level II Cache built into the processor
- **Memory:** Four DIMM sockets supporting up to 512MB, FPM, EDO, SDRAM and ECC
- **Chipset:** Intel® 82440LX PCI set, fully complied with PC 97 specification
- **BIOS:** Award Flash BIOS with plug and play supporting PCI V2.1, Pc 97
- **On Board I/O:** PCI EIDE, FDD, 2 Serial, 1 Parallel, USB, PS2 Keyboard and Mouse

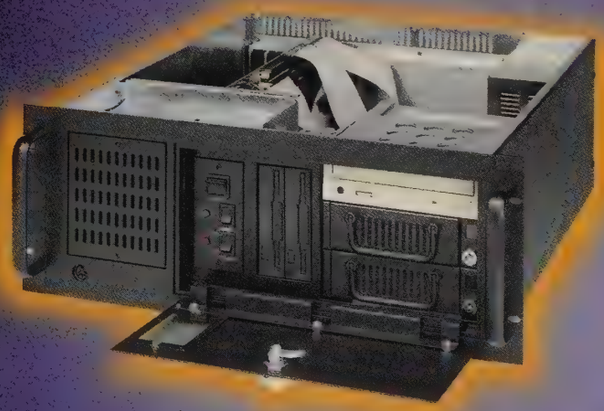
SBC - Pentium® MMX



MMX

- **CPU:** Intel, AMD or Cyrix CPU with MMX Technology Up to 233MHz for P55C Pentium Processor
- **Cache:** 512K Pipe Line Burst Cache
- **Memory:** Up to 384MB- FPM, EDO or ECC memory
- **BIOS:** AWARD Plug & Play BIOS
- **Chipset:** Intel 430HX Chipset
- **On Board I/O:** PCI Bus Master (E)IDE, FDD,16550 UART Serial, EPP/ECP Parallel, USB,PS2 Mouse & Keyboard
- **OS Compatibility:** Windows NT/95/3.1.x, OS/2 Warp SCO UNIX, Netware and DOS

COMPACT, Fault Resilient System



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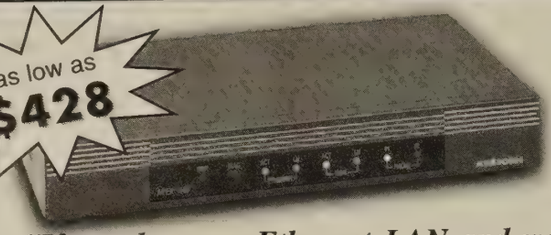

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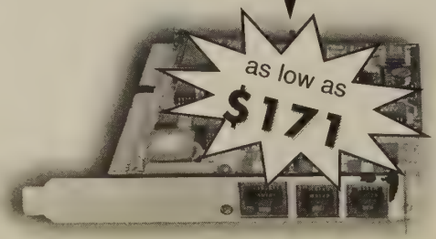

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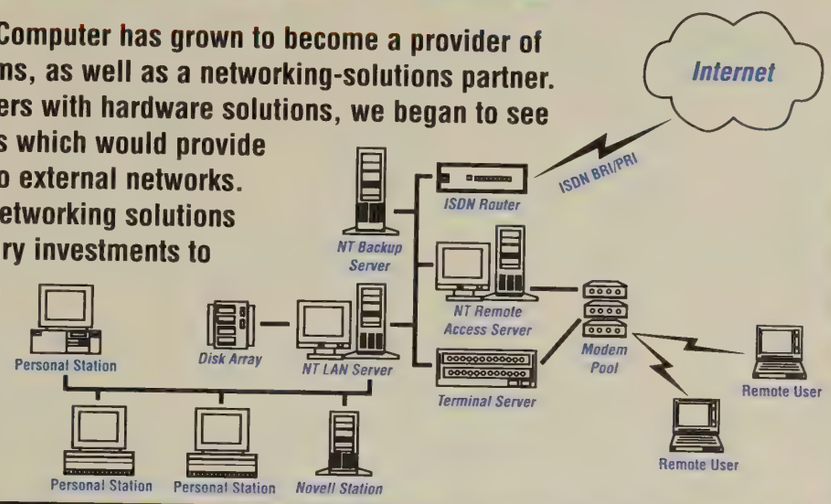

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SanDisk 4MB Compact Flash Card and Type II PC Adapter	$ 499.97
SanDisk 8MB Compact Flash Card and Type II PC Adapter	$ 149.97
SanDisk 10MB Compact Flash Card and Type II PC Adapter	$ 179.97
SanDisk 15MB Compact Flash Card and Type II PC Adapter	$ 229.97
SanDisk 20MB Compact Flash Card and Type II PC Adapter	$ 329.97
SanDisk 40MB Compact Flash Card and Type II PC Adapter	$ 699.97
SanDisk 85MB Compact Flash Card and Type II PC Adapter	$ 1579.97
Simple Technology 4MB Compact Flash Card and Type II PC Adapter	$ 989.97
Simple Technology 8MB Compact Flash Card and Type II PC Adapter	$ 129.97
Simple Technology 16MB Compact Flash Card and Type II PC Adapter	$ 179.97
Simple Technology 24MB Compact Flash Card and Type II PC Adapter	$ 259.97
Simple Technology 32MB Compact Flash Card and Type II PC Adapter	$ 299.97
Simple Technology Type II Compact PC Adapter	$ 19.97

MONITORS

APPLE	
Multiscan 15AV 15" Display-1024x768-13.75" viewable-.28dp	$ 385.97
Multiscan 720 17" Display-1024x768-16" viewable-.28dp	$ 639.97
Multiscan 750 17" Display-1280x1024-16.1" viewable-.25dp-trinitron	$ 849.97
Multiscan 750AV 17" Display with speakers-1280x1024-16.1" viewable-.25dp	$ 949.97
Multiscan 850 20" Display-1600x1200-19" viewable-.26dp-trinitron	$ 1749.97
Multiscan 850AV 20" Display-1600x1200-19" viewable-.26dp-trinitron	$ 1849.97
Impression 14" 1024 x 768 .28dp	$ 148.97
Impression 15" 1280 x 1024 .28dp	$ 203.97
Impression 14" 1280 x 1024 .28dp	$ 398.97
Princeton EO40 Ultra 14" .28dp 1024x768	$ 254.97
Princeton EO50 Ultra 15" .28dp 1280x1024	$ 279.97
Princeton EO70 Ultra 17" .28dp 1280x1024	$ 449.97
NEC Multisync A500 15"	$ 319.97
NEC Multisync A700 17" .28 - 1280x1024	$ 557.97
NEC Multisync E500 15" .25dp	$ 389.97
NEC Multisync E700 17" .25dp	$ 689.97
NEC Multisync E1100 21" .28dp 1280x1024	$ 1289.97
NEC Multisync M500 15" .25dp 1024x768	$ 364.97
NEC Multisync M700 17" .25dp 1024x768	$ 754.97
NEC Multisync P750 .25dp	$ 769.97
NEC Multisync P1150 21" .25dp - 1360x1024	$ 1399.97
Sony 100ES 15" (13.9" viewable) .25dp Trinitron-1024x768	$ 354.97
Sony 100SX 15" (13.9" viewable) .25dp Trinitron	$ 341.97
Sony 100SF 15" (13.9" viewable) .25dp Trinitron - 1280x1024	$ 365.97
Sony 200ES 17" (15.9" viewable) .25dp Trinitron-1024x768	$ 623.97
Sony 200GS 17" (15.9" viewable) .25dp Trinitron-1152x870	$ 689.97
Sony 200SX 17" (15.9" viewable)1024x768 .25dp Trinitron	$ 609.97
Sony 200SF 17" (15.9" viewable) .25dp Trinitron -1280x1024	$ 699.97
Sony 300SFT 20" (19" viewable) .30dp Trinitron-1280x1024	$ 1379.97
ViewSonic E641 14i 1024 x 768 .28dp	$ 184.97
ViewSonic E655 15i 1024 x 768 .28dp	$ 264.97
ViewSonic 15GS 15i - 1280x1024	$ 329.97
ViewSonic G771 17i 1024 x 768 .27dp	$ 534.97
ViewSonic E771 17i 1024 x 768 .27dp	$ 464.97
ViewSonic 17EA 17i 1024 x 768 .27dp	$ 534.97
ViewSonic G773 17i 1280 x 1024 .28dp	$ 542.97
ViewSonic 17GA with speakers - 17" -1152x870 -.27dp	$ 569.97
ViewSonic Q71 17" 1280x1024-.28dp-16" viewable	$ 499.97
Viewsonic 17PS .25 1600x1280	$ 684.97
Viewsonic GT770	$ 674.97
Viewsonic GT775 17" .25 - 1600x1280	$ 639.97
Viewsonic G800	$ 999.97
Viewsonic G810	$ 1199.97
Viewsonic P810 21" .25 - 1600x1280	$ 1248.97
Viewsonic PT813 21" .25 - 1600x1200	$ 1449.97
Viewsonic P815 21" .25dp - 1800x1440	$ 1444.97
ViewSonic PT775 17i 1600 x 1200 .25dp	$ 669.97
ViewSonic Optiquest V773	$ 484.97
ViewSonic Optiquest V95 19" (18" viewable) 1600x1200 .26dp	$ 959.97

MOTHERBOARDS
DESCHUTES BOARDS AVAILABLE HERE!!

ASUS	
SP97 Pent75-233 SIS w/512k AT	$ 84.97
P55T2P4 Pent-75-233 Triton HX chips w/512k AT	$ 125.97
TXP4 Pent75-233 Triton TX chips w/512K/3 ISA & 4 PCI AT	$ 139.97
TX97E Pent75-233 Triton TX chips w/512k AT	$ 146.97
TX97X Pent75-233 Triton TX chips w/512k ATX	$ 149.97
TX97XE Pent75-233 Triton TX chips w/512k ATX	$ 162.97
P2L97 P II 233-333 440LX AGP w/scsi ATX	$ 219.97
P2L97-DS Dual P-II 233-333 440LX AGP w/scsi ATX	$ 389.97
ASUS Ball Bearing Fan for TX97E, TX97X, TX97XE	$ 14.97
ASUS PS/2 and USB Adapter card for the TX97E	$ 14.97
AOPEN	
APST AXST ATX 430TX 521k	$ 122.97
AX6L 440lx P-II 300 w/AGP ATX	$ 194.97
BIOSTAR	
M5ATA AU Super TX AT	$ 88.97
500TTD 430TX chips 512k AT	$ 97.97
M6 TLA 440LX chips for P-II 300 w/AGP ATX	$ 172.97
TYAN	
Tomcat IV S1564S Single Triton HX w 512k AT	$ 139.97
Tomcat IV S1564D Dual Triton HX w 512k AT	$ 198.97
Titan Turbo II S1571S Triton TX w/512k AT	$ 114.97
Titan Turbo II S1573S Triton TX w/512k ATX	$ 124.97
Tiger P-II 233-300 440LX chips AGP ATX	$ 194.97
Tiger 2 Dual P-II 233-300 440LX chips AGP ATX	$ 294.97
Thunder 2 Dual P-II 233-300 w/2940UW, AGP ATX	$ 479.97
Tahoe ATX P-II Intel 430TX chipset	$ 137.97
ABIT	
SM5 Pent-75-233 Triton VX w/512k AT Jumperless	$ 82.97
PX5 Pent-75-233 Triton TX w/512k AT Jumperless	$ 88.97
AX5 Pent-75-233 Triton TX w/512k AT Jumperless	$ 104.97
IT5H Pent-75-233 Triton HX w/512k AT Jumperless	$ 114.97
LX6 P-II 233-333 LX AGP ATX Jumperless	$ 154.97
INTEL	
Atlanta P-II 400-LX chips AGP ATX w/o Sound Boxon retail box	$ 189.97
Atlanta P-II AL440LX / 512K cache/2 ISA & 4 PCI/AGP ATX w/Yamaha sound	$ 209.97
Intel R440LX Dual Pentium II with Ethernet & Adaptec 7895	$ 549.97
Lone Tree Pentm 166-233 LT430TX 512k w/o audio ATX - Ultimate DMA	$ 159.97
Anchorage AN430TX 512k w/Yamaha Audio ATX	$ 187.97
Portland PD440FX Pentium II with Sound Box	$ 214.97
Providence Dual Pentium Pro / ASB w Sound Card & 10/100TX & SCSI	$ 539.97

CPU

INTEL Pentium 150	$ 99.97
INTEL Pentium 166	$ 129.97
INTEL Pentium 166 MMX	$ 128.97
INTEL Pentium 200	$ 198.97
INTEL Pentium 200 MMX	$ 214.97
INTEL Pentium 233 MMX	$ 288.97
INTEL Pentium II 233 MMX 512k	$ 379.97
INTEL Pentium II 266 MMX 512k	$ 498.97
INTEL Pentium II 300 MMX 512k	$ 729.97
INTEL Pentium Pro 180mhz	$ 189.97
INTEL Pentium Pro 200mhz	$ 499.97
CYRIX 6x86 MX PR166+ MMX	$ 88.97
CYRIX 6x86 MX PR200+ MMX	$ 117.97
CYRIX 6x86 MX PR233+ MMX	$ 258.97
CYRIX M2 200 MMX	$ 124.97
CYRIX M2 233 MMX	$ 254.97
AMD K5-166 MMX	$ 74.97
AMD K5-200 MMX	$ 88.97
AMD K5-233 MMX	$ 94.97
AMD K6-166 MMX	$ 129.97
AMD K6-200 MMX	$ 178.97
AMD K6-233 MMX	$ 239.97

HARD DRIVES

FUJITSU	
Ultra ATA/128K cache/10ms access/5400 rpm	
Ultra-ATA EIDE 1.7GB	$ 135.97
Ultra-ATA EIDE 2.6GB	$ 169.97
Ultra-ATA EIDE 3.5GB	$ 189.97
Ultra-ATA EIDE 4.3GB	$ 239.97
Ultra SCSI/512K cache/8ms access/7200 rpm	
Ultra SCSI 9.1 GB	$ 824.97
Ultra Wide SCSI 4.4GB	$ 524.97
Ultra Wide SCSI 9.1GB	$ 844.97
IBM	
UltraStar ES-8ms access/512 cache/5400 rpm	
IBM UltraStar ES 2.1GB (DCAS32160S) Ultra SCSI	$ 199.97
IBM UltraStar ES 2.1GB (DCAS32160W) Ultra Wide SCSI	$ 249.97
IBM UltraStar ES 4.3GB (DCAS34330S) Ultra SCSI	$ 318.97
IBM UltraStar ES 4.3GB (DCAS34330W) Ultra Wide SCSI	$ 329.97
UltraStar XP-8ms access/512 cache/7200 rpm	
IBM UltraStar XP 9.1GB (DCAS39100S) Ultra SCSI	$ 799.97
IBM UltraStar XP 9.1GB (DCAS39100W) Ultra Wide SCSI	$ 809.97
QUANTUM	
BIGFOOT-128 cache/12ms access/4000 rpm	
Quantum Bigfoot 1.2 GB	$ 88.97
Quantum Bigfoot 2.5 GB	$ 119.97
Quantum Bigfoot 4.3 GB Fast ATA	$ 189.97
Quantum Bigfoot 6.4 GB Fast ATA	$ 249.97
Quantum Bigfoot 4.0 GB Ultra ATA	$ 229.97
Quantum Bigfoot 6.0 GB Ultra ATA	$ 299.97
Quantum Bigfoot 8.0 GB Ultra ATA	$ 344.97
Quantum Bigfoot 12.0 GB Ultra ATA	$ 424.97
FIREBALL - 128K/10ms access/5400 rpm	
Quantum Fireball ST 1.6 Ultra-ATA	$ 149.97
Quantum Fireball ST 2.1 Ultra-ATA	$ 179.97
Quantum Fireball ST 3.2 Ultra-ATA	$ 189.97
Quantum Fireball ST 4.3 Ultra-ATA	$ 234.97
Quantum Fireball ST 6.4 Ultra-ATA	$ 299.97
Quantum Fireball ST 2.1 Ultra-SCSI	$ 224.97
Quantum Fireball ST 3.2 Ultra-SCSI	$ 269.97
Quantum Fireball ST 4.3 Ultra-SCSI	$ 324.97
Quantum Fireball ST 6.3 Ultra-SCSI	$ 399.97
STRATUS-128K cache/4500 rpm	
Quantum Stratus 1.6GB IDE	$ 154.97
Quantum Stratus 2.1GB IDE	$ 189.97
Quantum Stratus 3.2GB IDE	$ 199.97
Quantum Stratus 4.1GB IDE	$ 264.97
Quantum Stratus 6.4GB IDE	$ 349.97
Quantum Stratus 2.1GB Ultra SCSI	$ 222.97
Quantum Stratus 3.2GB Ultra SCSI	$ 272.97
Quantum Stratus 4.1GB Ultra SCSI	$ 312.97
Quantum Stratus 6.4GB Ultra SCSI	$ 398.97
ATLAS II-512K cache/7200 rpm	
Quantum Atlas II 2.2GB (Q32275N) Ultra SCSI	$ 344.97
Quantum Atlas II 2.2GB (Q32275W) Ultra-Wide SCSI	$ 349.97
Quantum Atlas II 4.5GB (Q34550) Ultra SCSI	$ 497.97
Quantum Atlas II 4.5GB (Q34550W) Ultra-Wide SCSI	$ 519.97
Quantum Atlas II 9.1GB (Q39100N) Ultra SCSI	$ 799.97
Quantum Atlas II 9.1GB (Q39100W) Ultra-Wide SCSI	$ 829.97
VIKING-512K cache/7200 rpm	
Quantum Viking 2.2GB (Q32275VK) Ultra SCSI	$ 349.97
Quantum Viking 2.2GB (Q32275VKW) Ultra-Wide SCSI	$ 359.97
Quantum Viking 4.5GB (Q34550VK) Ultra SCSI	$ 497.97
Quantum Viking 4.5GB (Q34550VKW) Ultra-Wide SCSI	$ 483.97
WESTERN DIGITAL	
WD Caviar 2.1 GB EIDE	$ 159.97
WD Caviar 2.5 GB EIDE	$ 171.97
WD Caviar 3.2 GB EIDE	$ 179.97
WD Caviar 4.3 GB Ultra-DMA	$ 241.97
WD Caviar 5.1 GB Ultra-DMA	$ 269.97
WD Caviar 6.4 GB Ultra-DMA	$ 294.97
SEAGATE	
BARRACUDA - 512K cache/7200 rpm	
Barracuda 2.2 GB (ST322721N) Ultra SCSI	$ 369.97
Barracuda 2.2 GB (ST322721W) Ultra Wide SCSI	$ 379.97
Barracuda 4.3 GB (ST345721N) Ultra SCSI	$ 574.97
Barracuda 4.3 GB (ST345721W) Ultra Wide SCSI	$ 569.97
Barracuda 4.3 GB Wide Differential SCSI	$ 754.97
Barracuda 9.1 GB (ST19171N) Ultra SCSI	$ 874.97
Barracuda 9.1 GB (ST19171W) Ultra Wide SCSI	$ 899.97
Barracuda 9.1 GB Wide Differential SCSI	$ 999.97
CHEETAH 512 cache/10,000 rpm	
Cheetah 4.5GB (ST34501N) Ultra SCSI	$ 679.97
Cheetah 4.5GB (ST34501W) Ultra Wide SCSI	$ 639.97
Cheetah 9GB (ST19191N) Ultra SCSI	$ 999.97
Cheetah 9GB (ST19191W) Ultra Wide SCSI	$ 999.97
Elite 23GB (ST423451N) Ultra SCSI / 1048K buffer / 5,400 rpm	$ 1794.97
Elite 23GB (ST423451W) Ultra Wide SCSI / 1048K buffer / 5,400 rpm	$ 1849.97

NETWORK CARDS

Acer ALN101 isa PCI Ethernet Card	$ 18.97
Acer ALN201 isa PCI Ethernet ComboCard	$ 21.97
3 COM 900 Combo PCI 10 Mbps Card	$ 93.97
3 COM 900 TPO PCI 10 Mbps Card	$ 84.97
3 COM 905 TX 10/100 Mbps Combo PCI Card	$ 69.97
3 COM 509B Combo ISA 10 Mbps Card	$ 74.97
3 COM 509 TPO ISA 10 Mbps Card	$ 49.97
Intel EtherExpress Pro 10BaseT/100TX Mbps PCI	$ 62.97
Netwave AirSurfer Plus Access Point - 2Mmps local RF network access	$ 1199.97
Netwave AirSurfer Plus PC Card - 2Mmps local RF client access	$ 399.97
Socket Ethernet & Serial Adapter PC Card - 10BaseT/Win 95/98 compatible	$ 259.97
Socket Ethernet Adapter PC Card-10BaseT/ Win 95/98 compatible	$ 129.97
Socket Ethernet Adapter PC Card-10BaseT/10Base2 Combo-Win 958 compat	$ 159.97
USR Megahertz 33.6k XJack Cellular CruiseCard 33.6k fax/Modem	$ 249.99
USR Megahertz 33.6k XJack Cellular fax/Modem w/10BaseT Ethrnl PC Crd	$ 289.97
USR Megahertz 33.6k XJack Cellular fax/Modem w/10BaseT/Base2 PC Card	$ 329.97
USR Megahertz 10BaseT Ethernet connection PC Card	$ 119.97
USR Megahertz 10BaseT and 10Base2 Ethernet connection PC Card	$ 149.97

SCANNERS

Agfa SnapScan 310 300x600dpi - 30 bit color	$ 194.97
Agfa SnapScan 600 Art Line 600x1200dpi - 30 bit color	$ 392.97
Agfa Arcus II Desktop Pro 36 bit 600 x 1200 with transparency scan	$ 1334.97
Epson Expression 636 Executive	$ 734.97
Epson Expression 636 Professional	$ 1292.97
Epson Expression 836 12" x 17"	$ 2791.97
HP Scanjet 5S Color	$ 194.97
HP Scanjet 5P-1200dpi/includes software	$ 439.97
HP Scanjet 6100c 2400dpi w/slide adapter	$ 789.97
Microtek Scanmaker V-310 - 600dpi	$ 146.97
Microtek Scanmaker E3 Plus - 300dpi	$ 144.97
Microtek Scanmaker E6 Pro w/Photoshop LT- 600dpi	$ 527.97
MicroTek Scanmaker III with transparency adapter	$ 1399.97
Nikon Super CoolScan LS-1000	$ 1769.97
Nikon Scantouch AX 210	$ 374.97
Nikon CoolScan II Ext LS / Slide scanner	$ 914.97
Visioneer Strobe Color 600dpi	$ 197.97
Visioneer 6400 2400dpi	$ 297.97
Visioneer PaperPort Strobe-24 bit color at 300dpi-w/PaperPort 5.1 software	$ 247.97
Visioneer Paperport Deluxe 5.1-document converting software	$ 99.97
UMAX Astra 600S Scanner-30-bit color/300x600/up to 8.5" by 14"-SCSI	$ 147.97
UMAX Astra 610S Flatbed Scanner-300x600-30bit color-with Photoshop	$ 139.97
UMAX Astra 1200S Flatbed Scanner-600x1200-30bit color-w/Photo Deluxe	$ 229.97
UMAX Powerlook II w/transpar adapter-600x1200-Full Photoshop & Binuscan	$ 1339.97

SOUND CARDS

Creative Labs Sound Blaster16 PnP	$ 44.97
Creative Labs Sound Blaster 32	$ 72.97
Creative Labs Sound Blaster AWE 64 Value Retail	$ 77.97
Creative Labs Sound Blaster AWE 64 Gold Retail	$ 169.97

SYSTEMS

APPLE	
20th Anniversary Power Mac - 603@250/32MB/512K L2/24x /4GB/33.6	$ 3979.97
Power Macintosh G3 233 Desktop - 32MB/24x CD-Rom/4GB/10baseT/keybd	$ 1799.97
Power Macintosh G3 266 Desktop-32MB/24x/4GB/Zip Drive/10baseT/keybd	$ 2199.97
Power Macintosh G3 AV 233 Minitower-32MB/24x/6GB/10baseT/Audio/video	$ 2799.97
Power Macintosh 8600-604@250/32MB/512K L2/24x/4GB/Zip Drive/10BaseT	$ 2299.97
Power Macintosh 8600 - 604@300/32MB/512K L2/24x/4GB/Zip Drv/10BaseT	$ 2395.97
Power Macintosh 9600 - 604@300/64MB/1MB L2/24x/4GB/Zip Drv/10BaseT	$ 3597.97
Power Macintosh 9600 - 604@350/64MB/1MB L2/24x/4GB/Zip/10BaseT	$ 4499.97
Macintosh Powerbook G3 250- 750@250/12.1" active/32MB/5GB/20x	$ 4999.97
TOSHIBA	
Satellite Pro 460CDT/ P166mmx/12.1"TFT/32MB/2GB/10x CD-RO	$ 3294.97
Satellite Pro 460CDX	$ 2494.97
Satellite Pro 440CDT/ P133mmx/12.1"TFT/32MB/1.35GB/10x CD-ROM	$ 2599.97
Satellite Pro 440CDX / P133mmx/12.1"FSCAN/16MB/1.35GB/10x	$ 1974.97
Satellite Pro 740CDX / P166mmx/13.3"TFT/16MB/2GB/10x /28.8	$ 4399.97
Infinia 7202 P200 MMX 32mb/4.0GB	$ 1499.97
Infinia 7231 P233 MMX 64mb/4.0gb/DVD	$ 1894.97
Infinia 7260 P-II 266 MMX 64mb/4.0gb/24x CD	$ 1999.97
IBM ThinkPad 380E P150mmx/12.1" DSTN	$ 1999.97
IBM ThinkPad 380ED P166mmx/12.1" TFT	$ 3399.97
IBM ThinkPad 560 - P133/11.3"TFT	$ 3799.97
IBM ThinkPad 560E - P166mmx/12.1" TFT/16MB/2.1GB	$ 3799.97
IBM ThinkPad 770 - P233 mmx/14.1" TFT/32MB/5GB	$ 6399.97
SONY VAIO	
PCV-200 PII-233mmx/32MB-4.3GB -24x-33.6K fax/modem-Zip drv	$ 2199.97
PCG-705C P150mmx /16MB-2.1GB-14x CD-ROM-33.6 modem-12.1 TFT	$ 2649.97
PCG-717C P2000mmx / 32MB - 2.1GB-14x -33.6 modem-12.1 TFT	$ 3599.97

PALMTOPS & PEN COMPUTERS

Cassiopeia A-20 HPC-win CE 2.0 640x240 Mono/8MB/Pocket MS	$ 599.97
Cassiopeia Power Pack-Docking Station/AC adap/batt pack/charger	$ 139.97
Cassiopeia AC set- Casio Mini dock with AC adapter	$ 59.97
Cassiopeia Rechargable Nickel Metal Hydride battery	$ 79.97
Cassiopeia serial cable	$ 34.97
Toshiba Libretto CT-50	$ 1489.97
Toshiba Libretto CT-70	$ 1989.97
Toshiba Libretto CT-50/CT-70 Enhanced Port Replicator	$ 179.97
Toshiba Libretto Memory Upgrade 8MB	$ 99.97
Toshiba Libretto Memory Upgrade 16MB	$ 169.97
Phillips VELO-1 12MB/Velo Dock/AC adapter/NiMH battery	$ 499.97
Phillips VELO-1 8MB/Velo Dock/AC adapter/NiMH battery	$ 449.97
Phillips VELO-1 4MB/Velo Dock/AC adapter/NiMH battery	$ 379.97
Phillips VELO V-Module PCMCIA Card Dock	$ 99.97
Phillips VELO Dock Docking station	$ 79.97
Phillips VELO to PC Cable	$ 39.97
Phillips VELO Carrying Case	$ 49.97
Phillips VELO Rechargable Battery Pack	$ 49.97
Phillips VELO International AC/wall adapter	$ 34.97
Phillips VELO Mini DRAM 4MB module	$ 179.97
Phillips VELO Mini DRAM 8MB module	$ 297.97

VIDEO & GRAPHIC CARDS

ATI 3D Xpression Plus w/o PC2TV 2 MB SGRAM	$ 68.97
ATI 3D Xpression Plus w/o PC2TV 4 MB SGRAM	$ 86.97
ATI 3D Pro Turbo 4MB SGRAM	$ 126.97
ATI 3D Pro Turbo 8MB SGRAM	$ 169.97
ATI Xpert@Play PCI 4MB Retail Box	$ 168.97
ATI Xpert@Play AGP 4MB Retail Box	$ 185.97
ATI Xpert@Play PCI 8MB Retail Box	$ 219.97
ATI Xpert@Play ATI 8MB Retail Box	$ 234.97
ATI Xpert@Work PCI 4MB Retail Box	$ 164.97
ATI Xpert@Work AGP 4MB Retail Box	$ 173.97
ATI Xpert@Work PCI 8MB Retail Box	$ 209.97
ATI Xpert@Work AGP 8MB Retail Box	$ 219.97
ATI All-in-Wonder 4MB Retail package	$ 209.97
ATI TV Tuner for use with all the ATI 3D VGA Cards	$ 109.97
ATI XClaim VR SGRAM 2MB	$ 239.97
ATI XClaim VR 2MB SVGA PCI Graphics Card	$ 187.97
ATI XClaim VR 4MB SVGA PCI Graphics Card	$ 248.97
ATI XClaim TV Tuner	$ 81.97
Diamond Monster 3D 4MB EDO DRAM Bulk Package	$ 148.97
Diamond Monster 3D 4MB Retail Pack w/games	$ 174.97
Diamond Viper V330 128bit 4MB SGRAM PCI Retail pack	$ 159.97
Diamond Viper V330 128bit 4MB SGRAM AGP Retail pack	$ 159.97
Diamond Stealth II S220 4MB Bulk Package	$ 97.97
Diamond Stealth II S220 4MB Retail Package	$ 109.97
Diamond Stealth 2000 3D Pro DRAM 2MB Bulk pack	$ 79.97
Diamond Stealth 2000 3D Pro DRAM 4MB Bulk pack	$ 84.97
Diamond Stealth 2500 with 1MB DRAM	$ 32.97
Diamond Stealth 2500 with 2MB DRAM	$ 42.97
Diamond Stealth 3D 3000 2MB VRAM	$ 104.97
Diamond Stealth 3D 3000 4MB VRAM	$ 144.97
Diamond Stealth 64 PCI 2 MB(VRAM)	$ 84.97
Diamond Stealth 64 PCI 4 MB (VRAM)	$ 128.97
Diamond Fire GL 100 Pro PCI 8MB SGRAM	$ 209.97
Diamond Fire GL 1000 Pro PCI 4MB SGRAM	$ 169.97
IX Micro Twin Turbo 128M 2 MB PCI VR	$ 239.97
IX Micro Twin Turbo 128M 4 MB PCI VR	$ 299.97
IX Micro Twin Turbo 128M 8 MB PCI VR	$ 489.97
IX Micro Prorez 2D/3CD Accellerator 4MB	$ 279.97
IX Micro Ultrez Ultimate Rez 2D/3CD Accellerator 8MB	$ 542.97
IX Micro Turbo TV	$ 94.97
Matrox Mystique 220 4MB SGRAM PCI Retail package	$ 139.97
Matrox Rainbow Runner for Mystique	$ 189.97
Matrox Millenium II 4MB WRAM Retail package	$ 189.97
Matrox Millenium II 8MB WRAM Retail package	$ 269.97
Matrox Millenium II PCI 4MB WRAM Retail package	$ 209.97
Matrox Millenium II AGP 4MB WRAM Retail package	$ 209.97
Matrox Millenium II upgrade from four to 8MB of WRAM	$ 187.97
Matrox Millenium II upgrade from four to 12MB of WRAM	$ 267.97
Matrox TV Tuner	$ 74.97
Matrox m3D 3D Accellerator PCI/AGP	$ 94.97
Number Nine Imagine 128bit S2E PCI 4 MB	$ 109.97
Number Nine Imagine 128bit 2 PCI 8MB VRAM	$ 724.97
Number Nine Reality 334 4MB SGRAM AGP	$ 119.97
Number Nine Revolution 3D 4MB WRAM AGP	$ 229.97
Number Nine Revolution 3D 8MB WRAM AGP	$ 309.97

PIM PERSONAL INFORMATION MANAGERS

AppleMate 300 Mobile Computer-serial port/software/IrDA port/speakers	$ 789.97
Newton MessagePad 2100-8MB/backlit LCD/IrDA port 2 type II slots	$ 997.97
Newton Keyboard	$ 79.97
Newton Carrying Case	$ 49.97
Newton MP2000/2100 Series Rechargable Battery Pack	$ 39.97
Newton MP2000/2100 Series Serial Adapter	$ 24.97
Newton Message Pad 2100 Pen	$ 19.97
Newton MessagePad and Newton keyboard Leather Carrying Case	$ 99.97
Newton 9 watt Ac wall power adapter	$ 32.97
Newton MessagePad 120 or 130 Rechargeable Battery Pack	$ 19.97
Newton 4MB Flash Storage Card	$ 129.97
Newton 8MB Flash Storage Card	$ 199.97
Rolodex REX 1 64k /PC Companion-credit card size data organizer	$ 129.97
Rolodex REX 3 256k /PC Companion-credit card size data organizer	$ 149.97
Rolodex REX-3DS 256k /PC Companion-data organizer & docking station	$ 179.97
Rolodex REX Docking Station	$ 39.97
3COM Palm Pilot Professional - the fastest & easiest-sync to PC data	$ 359.97
3COM Palm Pilot Personal	$ 249.97
3COM Palm Pilot Hot Sync cable for the PC	$ 19.97
3COM Palm Pilot Hot Sync cable for the Mac	$ 19.97
3COM Palm Pilot MacPac Accessory Kit	$ 15.97
3COM Palm Pilot Cradle for the Mac	$ 29.97
3COM Palm Pilot Professional 1MB memory upgrade	$ 109.97
3COM Palm Pilot Network Hot Sync Software	$ 69.97
3COM Palm Pilot Deluxe Leather Case	$ 59.97
3COM Palm Pilot Slim Leather Case	$ 29.97
3COM Palm Pilot Style package of 3	$ 5.97
3COM Palm Pilot Leather Belt Case	$ 22.97
3COM Palm Pilot Slim Leather Hand Case	$ 22.97
3COM Palm Pilot Modem - uses 3 AA batteries	$ 129.97
3COM Palm Pilot AC wall Adapter	$ 19.97
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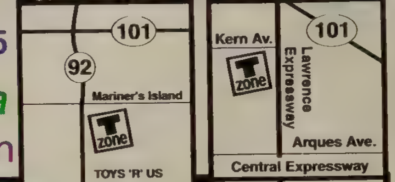

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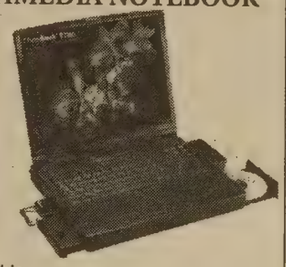

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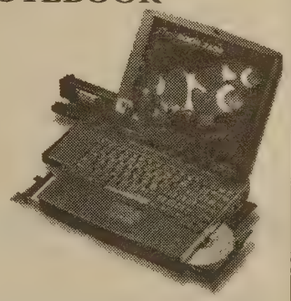

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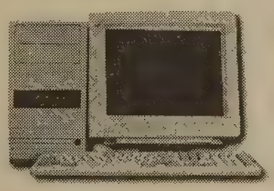

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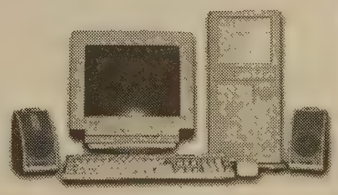

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BY PAUL HOFFMAN

Industry Insights

The Future Of Java—It's In the Hands of the Courts and Developers

Sun Microsystems, the original developer of the Java programming language and operating environment, is fighting for control of Java, using everything from press hype to lawsuits. Its main perceived rival, Microsoft, is already taking a strong lead in determining how Java is used, and Sun is pulling out all stops in an attempt to stay in control. However, it has a long way to go in the battle because the real arbitrators, the users, have yet to see almost any products.

To most computer users, "Java" is 1997's version of "multimedia" in 1990: it sounds attractive, it might even be achievable, but the promise is nowhere near being met in the marketplace. Because Java is two things (a programming language and an operating environment), it's easy for Sun to sell one while delivering the other. However, after two years of this, many users are asking "when will it be real?"

Worse yet for Sun, it's not just users who are asking this. Even developers who are programming in Java are finding that many of Sun's promises are not coming true. Most notably, Sun is saying that you can run Java programs on any computer platform, and that has been shown to be untrue. Not that programmers are abandoning Java as a language: it still works quite well for that. But the reality of Java's limitations are becoming more and more apparent to everyone but Sun.

Java's Early Potential

When Sun introduced Java a little more than two years ago, it started off as a programming language that could evolve into an operating environment that would work on any operating system.

It garnered a lot of interest in the programming community because it had most of the best features of the popular C++ language, and had a few significant improvements as well. Developers looked forward to a new language that would make complex, multi-programmer tasks go more smoothly.

However, Sun didn't invent Java to be just another programming language. Sun has always envied Microsoft's dominance of the PC desktop, and it looked to Java to be the tool that would help Sun win the desktop wars. Last year, Sun racheted up the publicity for Java, making it look like it would be the savior of corporations that have computers that run more than one operating system (that is, all of them).

To some extent, Sun was right: Java could take over the corporate desktop, but only if Sun did everything right, which of course is almost impossible for any company. Instead, Java progressed mostly as a very useful programming language, and its potential as a universal operating environment still isn't anywhere near being met. This caused problems for early Java adopters, who were relying on the cross-platform promise.

Developer Backlash

In the past six months, developers have started being more vocal in their complaints about how Sun is positioning Java. Sun's favorite saying is "write once, run everywhere," indicating that a single program will run similarly on many different operating systems. The current joke is that Java is "write once, debug everywhere," since each implementation of Java still seems quite different.

TO MOST COMPUTER USERS, "JAVA" IS 1997'S VERSION OF "MULTIMEDIA" IN 1990: IT SOUNDS ATTRACTIVE, IT MIGHT EVEN BE ACHIEVABLE, BUT THE PROMISE IS NOWHERE NEAR BEING MET IN THE MARKETPLACE.

Because many developers rely on Sun for early releases of new Java components, they are reluctant to criticize Sun in public. However, many online and print magazines have been running articles where many different Java companies are openly worried about Java not living up to its promise. And they're particularly upset at Sun for having the wrong priorities while Java is still clearly not ready for prime time.

Many of these same developers also have close ties with Microsoft because Microsoft owns most of the desktops of corporate America. Even more importantly, Microsoft has

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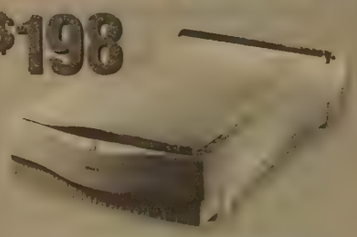

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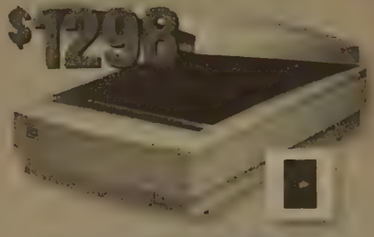

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Scanners are like cameras — you can get good results from the affordable models, but for the best possible images you have to spend a bit extra. At $1298, the Umax PowerLook 2 isn't cheap, but with its high-quality tri-linear CCD optics, it offers great value to those looking for outstanding results.

When *Windows Magazine* reviewed the PowerLook 2, it said "'gorgeous' is an understatement. Shadows and deep tones all come through and the sharpest details are rendered accurately both in monochrome and color." No wonder *PC Computing* named it "the best of the 36-bit scanners." The PL2 comes with Adobe Photoshop 4.0, binuscan PhotoPerfect, a transparency adapter, and a SCSI-2 adapter.

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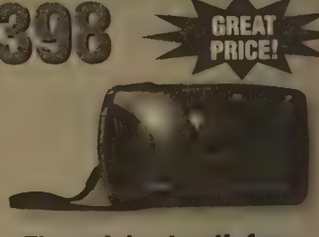

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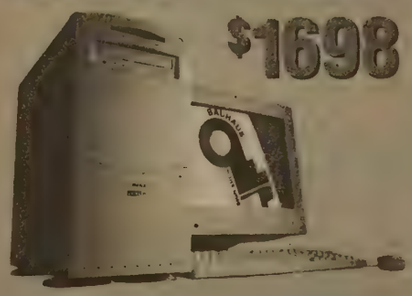
UMAX STATION – PENTIUM II 233MHZ MMX



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If you want cutting-edge power at a comfortable price, try the capable UmaxStation P2/233MMX. With its Pentium II, you'll have all the processing power you need to run Photoshop filters at top speed. A while back this kind of power would have cost you thousands, but now you can have a graphics powerhouse for less than two grand — including CD-ROM, 15" monitor, AND a FREE color scanner!

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Industry Insights *continued...*

one of the best systems for developing Java programs. These developers have started asking Sun to tone down the anti-Microsoft rhetoric and focus on making the Java environment as good as they promised it would be.

Instead of backing down, Sun has done the opposite: it has sued Microsoft for breach of contract in Microsoft's use of Java. Basically, Sun says that Microsoft agreed to distribute Java with all of Sun's extensions, including those that replicate things that are in Windows 95 and Windows NT; Microsoft says that the contract doesn't say that. After major wrangling, the two sides let everyone see the contract, and to no one's surprise, it is an impenetrable pile of legalese. Good luck to the judge who gets this case.

Just A Language

Sun's anger at Microsoft is based on Microsoft's assertion that Java is only useful as a language, not as an operating environment. They say that although Java can be made into an operating environment with a lot of work, it isn't there yet, and the indications are that even after that work is done, it's going to be slow and limited. Quietly, many Java supporters agree with Microsoft, some of them wishing otherwise.

Even Sun's biggest supporters agree that the current cross-platform environment is slow, probably too slow for commercial use. Like all software vendors, Sun insists that the next version (in this case, Java 1.2) will fix these problems and will run almost as fast at the native operating system. Almost no one believes this, mostly because Java is quite complex and will always add a fair amount of overhead. The fact that Sun said the current version would be fast enough doesn't give developers much confidence, either.

Note that Microsoft isn't "anti-Java:" in fact, Microsoft's Java development environment is considered to be one of the best (if not the best) available. However, Microsoft's toolkit is not meant to be cross-platform, but is instead for Windows only. Java programmers who only care about Windows report that Microsoft's Windows-only extensions are extremely useful, and Sun should consider making cross-platform equivalents of them as soon as possible.

Incomplete Compatibility

Sun's other complaint about Microsoft is that the Java Microsoft is shipping isn't compatible with the Java standard set by Sun. They rant about how this is destroying the ability of developers to create single programs that run the same everywhere. It makes for a compelling argument.

Microsoft responds that it's true that they are not fully compatible, and points out that none of the Java implementations out there are. Most notably, Netscape shipped a version of Java that had similar incompatibilities to Microsoft's, and yet Sun has not sued Netscape. Specifically, neither Microsoft's Internet Explorer or Netscape's Communicator

continued on page 26

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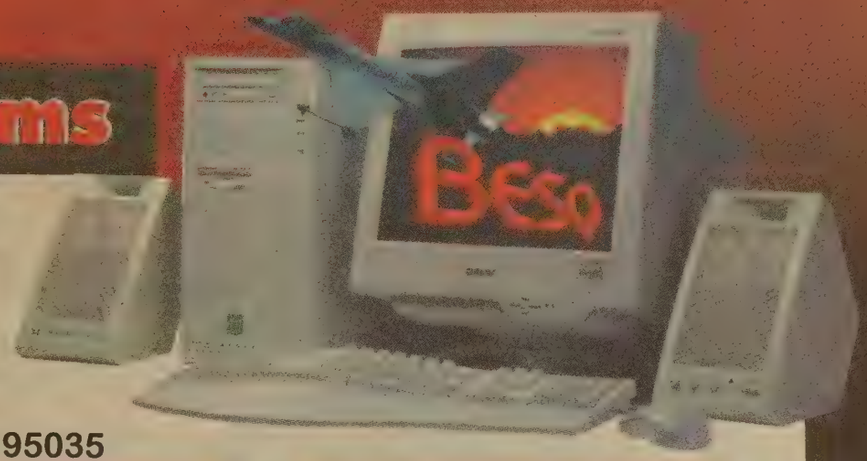

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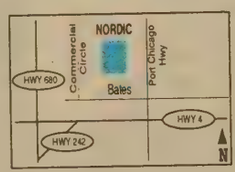

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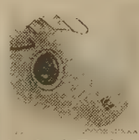
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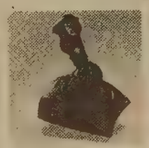
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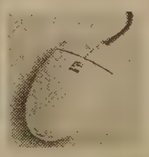
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Industry Insights *continued from page 23*

come with the Java Native Interface (JNI), although Netscape is planning to release one soon, and neither supports the standard Java security package. Of course, Netscape doesn't sell operating systems that rile Sun (at least not yet).

Tests run by computer magazines such as *InfoWorld* show that the amount compatibility between Java implementations varies, but that today's Java environments do not allow "write once, run everywhere," even when using programming code that is certified by Sun to work. This is the same as what many developers are saying quietly: the dream of cross-platform compatibility has yet to be realized.

Who Will Decide Java's Fate?

Sun clearly feels that it "owns" Java, and is trying to disentangle Microsoft from the Java world. In doing so, Sun is making many Java developers fearful of splitting the world into two Javas. On the other hand, Java developers who don't care that much about Windows are quite happy with Sun for taking on the anti-Microsoft fight.

The fight misses much of the point, however: It is the consumer who will determine whether or not Java becomes an important technology. If consumers are willing to sacrifice speed for cross-platform capabilities, the Java environment could certainly be a winner. However, consumers rarely are willing to use systems that are labelled "slow," particularly when there are faster systems that look the same.

In the case of Java, because Microsoft will always produce a Java language for Windows, and the plain language will always be faster than a Java environment that has to perform like an operating system, Sun will always have an uphill battle to convince people that the cross-platform features are all that useful. Given that the world has pretty much given up on desktop operating systems other than Windows, Sun's claim about importance of cross-platform utility is difficult to believe.

The consumer is always the arbitrator of what wins, but in the case of Java, the consumer is not usually a single end-user. Instead, the people who choose whether or not to use Java as an environment instead of just a programming language are corporate Information Services (IS) departments. They are the ones most concerned with cross-platform issues, and they are often much pickier than even software developers about issues such as programs looking exactly the same on different operating systems.

To date, most IS departments have taken a "well, maybe" attitude about Java. Those that have jumped on the Java bandwagon are doing so mostly for its use as a better development language than C++, and are hoping that it will also pay off for cross-platform development, but aren't betting too much on it. IS managers are usually conservative, and aren't willing to spend too much on gee-whiz technology that doesn't prove itself in the first few years, and Java has already missed that mark.

Thus, even if Sun and other Java developers are crazy for the new language-plus-operating-environment, it may not make it. Given Sun's positioning of Java's operating environment as an alternative to Microsoft, something that only a few customers find all that important, it is not clear if Java will be the big hit that Sun is betting on. ■

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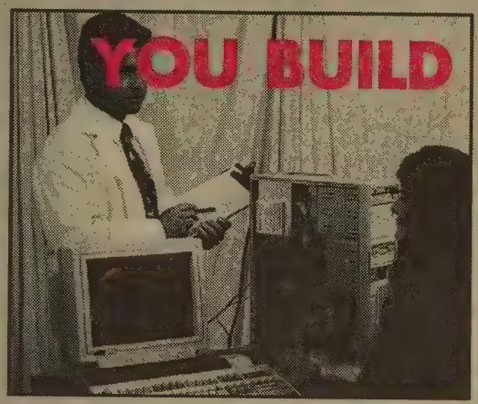

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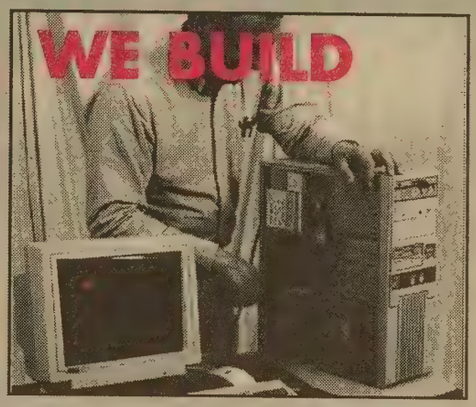

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Industry Insights *continued...*

MICROTIMES STOCK INDEX CONTINUES TO HEAD SOUTH

EXCH	COMPANY	TICKER SYMBOL	CLOSING PRICE 12/10/97	CLOSING PRICE 01/14/98	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
	SOFTWARE										
NAS	Adobe	ADBE	40.63	38.88	-1.75	-4.31	15	0.20	0.51	53.13	32.50
NAS	Autodesk	ADSK	37.50	37.38	-0.13	-0.33	-	0.20	0.54	51.13	28.25
NAS	Borland	BORL	9.94	6.94	-3.00	-30.19	-	0.00	0.00	12.19	5.88
NAS	Broderbund	BROD	33.94	22.00	-11.94	-35.17	-	0.00	0.00	37.75	17.75
NAS	Informix (L)	IFMX	5.56	5.31	-0.25	-4.49	-	0.00	0.00	24.38	4.00
NAS	Macromedia	MACR	8.78	9.63	0.84	9.61	-	0.00	0.00	14.34	6.50
NAS	Microsoft	MSFT	142.25	131.13	-11.13	-7.82	49	0.00	0.00	150.75	83.50
NAS	Novell	NOVL	8.13	7.38	-0.75	-9.23	-	0.00	0.00	13.00	6.28
NAS	Oracle (L)	ORCL	23.44	19.56	-3.88	-16.53	28	0.00	0.00	42.13	17.75
NAS	Symantec	SYMC	25.13	23.44	-1.69	-6.72	22	0.00	0.00	27.75	12.00
	HARDWARE										
NAS	Apple	AAPL	14.75	19.75	5.00	33.90	-	0.00	0.00	29.56	12.75
NYS	Compaq	CPQ	60.00	58.25	-1.75	-2.92	25	0.10	0.17	79.56	28.50
NYS	Digital Equipment	DEC	40.19	37.50	-2.69	-6.69	30	0.00	0.00	53.81	25.00
NAS	Dell	DELL	91.13	91.38	0.25	0.27	40	0.00	0.00	103.88	30.00
NYS	Gateway 2000	GTW	31.00	33.81	2.81	9.07	50	0.00	0.00	46.25	19.38
NYS	Hewlett-Packard	HWP	63.75	63.00	-0.75	-1.18	21	0.60	0.95	72.94	48.13
NYS	IBM	IBM	106.50	102.63	-3.88	-3.64	17	0.80	0.78	113.50	63.63
NYS	Silicon Graphics (L)	SGI	14.00	11.44	-2.56	-18.30	46	0.00	0.00	30.31	10.94
NAS	Sun Microsystems	SUNW	37.88	42.31	4.44	11.72	22	0.00	0.00	53.31	25.88
NYS	Tandy	TAN	40.88	34.13	-6.75	-16.51	-	0.40	1.17	46.00	20.44
NYS	Xerox	XRX	74.56	70.88	-3.69	-4.95	18	1.30	1.83	88.00	54.38
	CPUs										
NYS	Advanced Micro Devices	AMD	19.88	18.44	-1.44	-7.23	-	0.00	0.00	48.50	2.69
NYS	Cypress Semiconductor (L)	CY	9.63	9.06	-0.56	-5.84	43	0.00	0.00	18.94	7.38
NAS	Intel	INTC	74.69	75.44	0.75	1.00	19	0.10	0.13	102.00	62.88
NYS	LSI Logic	LSI	21.19	21.88	0.69	3.24	19	0.00	0.00	46.88	18.63
NYS	Motorola	MOT	59.88	56.94	-2.94	-4.91	32	0.50	0.88	90.50	53.75
	COMMUNICATIONS										
NAS	3Com	COMS	35.75	32.69	-3.06	-8.57	37	0.00	0.00	78.25	24.00
NYS	AT&T (H)	T	57.81	65.63	7.81	13.51	22	1.30	1.98	65.63	30.75
NYS	BellSouth Corp. (H)	BLS	56.06	58.38	2.31	4.12	18	1.40	2.40	58.38	39.25
NAS	Cisco (H)	CSCO	56.92	57.00	0.08	0.15	49	0.00	0.00	60.63	30.19
NAS	MCI	MCIC	44.44	43.81	-0.63	-1.41	44	0.10	0.23	45.00	27.31
NYS	Northern Telecom	NT	47 16	44.50	-2.66	-5.63	31	0 30	0.67	56.94	31.06
	INTERNET										
NAS	Earth Link (H)	ELNK	22.50	28.50	6.00	26.67	-	0.00	0.00	28.50	8.63
NAS	Netcom (H)	NETC	20.75	23.56	2.81	13.55	-	0.00	0.00	25.00	7.88
NAS	Netscape (L)	NSCP	27.63	17.81	-9.81	-35.52	-	0.00	0.00	49.50	17.00
NAS	Yahoo (H)	YHOO	58.88	67.00	8.13	13.80	-	0.00	0.00	71.00	13.19
	MEDIA										
NYS	Disney (H)	DIS	93.81	96.50	2.69	2.86	34	0.50	0.52	100.75	67.88
NAS	TCI (H)	TCOMA	27.13	29.13	2.00	7.37	-	0.00	0.00	29.13	10.75

KEY: NYS = NEW YORK ASE = AMERICAN NAS = NASDAQ
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:	
ADVANCES	15
DECLINES	23
UNCHANGED	0
NEW HIGHS	8
NEW HIGHS	8
NEW LOWS	5

MOST ACTIVE ISSUES:		
LARGEST DOLLAR GAINER	Yahoo	$8.13
LARGEST DOLLAR LOSER	Broderbund	$-11.94
ARGEST PERCENTAGE GAINER	Apple	33.90 %
LARGEST PERCENTAGE LOSER	Netscape	-35.52 %

	CLOSE 12/10/97	CLOSE 01/14/98	NET CHANGE IN PERIOD	PERCENT CHANGE IN PERIOD
MICROTIMES STOCK INDEX	10922.72	10813.49	-109.23	-1.00
DOW JONES INDUSTRIAL AVERAGE	7978.79	7784.69	-194.10	-2.43
STANDARD & POOR'S 500 INDEX	969.79	957.94	-11.85	-1.22
N.Y.S.E. COMPOSITE	507.70	501.35	-6.35	-1.25
NASDAQ COMPOSITE	1596.61	1548.76	-47.85	-3.00

CLOSING QUOTES FOR GRAPH: DATE	MICRO TIMES	DOW JONES
06/05/97	9223.00	7305.29
07/03/97	9842.13	7895.81
07/31/97	11003.29	8222.61
08/28/97	10650.13	7694.43
09/25/97	11081.52	7848.01
10/16/97	10985.85	7938.88
12/10/97	10922.72	7978.79
01/14/98	10813.50	7784.69

Source: Nordby International Inc. *(http://www.nordby.com)*, Boulder, CO. This information is based on sources believed to be reliable, and while extensive efforts are made to assure its accuracy, no guarantees can be made. Nordby International assumes no liability for any inaccuracies. For information on Nordby's customized financial research services, call (303)938-1877.

The MicroTimes Stock Index continued to head south as the Asian financial crisis threatened to claim another victim. Our index fell -1.00%, or 109.23 points, to close the monthly trading period at 10813.50. The technology sector continued to be pummeled, as was evident in the -3.00%, or 47.85 point fall of the NASDAQ, which closed at 1548.76. The Dow Jones Industrial Average also moved lower, as it lost 194.10 points, or -2.43%, to close the trading period at 7784.69.

In our index, decliners outpaced advancers by a 23 to 15 margin. However, eight companies reached annual highs versus five that fell to a 52-week low.

Turning To Stocks In The Accompanying Table

Yahoo's stock rocketed $8.13 per share last month after the company reported significantly higher fourth-quarter net revenues. Shares of Yahoo closed at a price of $67.00 per share up 13.80%. The company reported net revenues totaling $25.1 million for the fourth quarter ended December 31, 1997 compared to net revenues of $8.9 million for the fourth-quarter of 1996, an increase of 181%. Pro forma net income was $2.5 million or $0.05 per share, compared with a net loss of $666,000 or $0.02 per share for the fourth quarter of 1996. "Yahoo! continues to be a leader in user traffic and advertising revenue," said Tim Koogle, president and CEO of Yahoo! "During 1997 we aggressively expanded on our core navigational guide platform and emerged as the leader in a wide array of content and services. Our aggressive expansion of Yahoo!'s global-branded network of properties helped us drive both our traffic and our revenues to record levels."

Shares of Apple Computer headed north after the company announced rising net profits. Apple's stock increased $5.00 per share, or 33.90%, to close the period at a price of $19.75. Apple reported that for the fiscal 1998 first quarter ended December 26, the company generated revenues of $1.6 billion and unit sales of 635,000. The company recorded a quarterly net profit of $47 million, resulting in basic and diluted earnings per share of $.37 and $.33, respectively. Apple recorded a net loss of $161 million, or $1.26 per share, in the September quarter, and recorded a net loss of $120 million, or $0.96 per share, in the year-ago quarter. The profitable results were buoyed by the successful introduction of the Company's Power Macintosh G3 computers on November 10. Over 133,000 units of the G3 systems shipped during the quarter, rendering the G3 launch the most successful in the company's history.

Netscape's stock headed south after the company stated that it is expected to lay off about 400 permanent and contract workers as part of a previously announced restructuring. Shares of Netscape fell -35.52%, or $9.81 per share, to close the monthly trading period at $17.81. Earlier this month Netscape predicted an undetermined number of job cuts as aresult of an estimated fourth-quarter operating loss of $14-$18 million, or $0.15-$0.19 a share. The company attributed the situation to competitive price pressure from Microsoft. ■

—Ryan Reichenbach, Production Manager
Nordby International, Inc.

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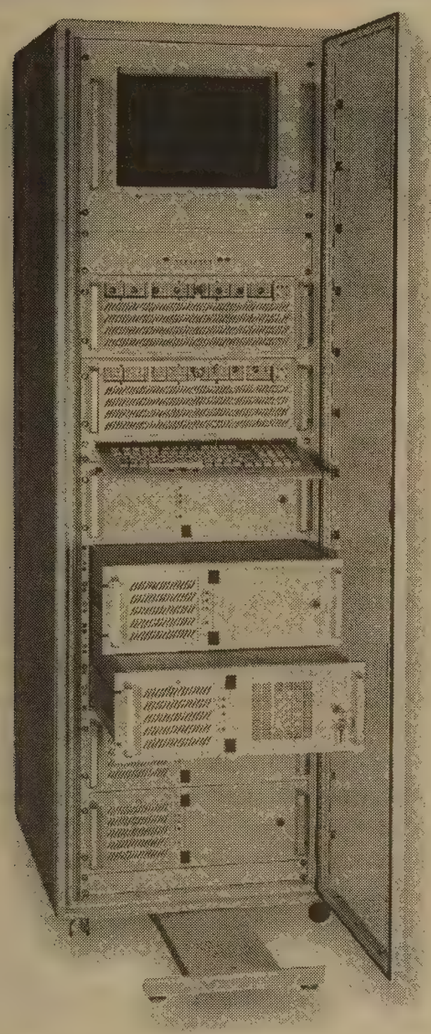

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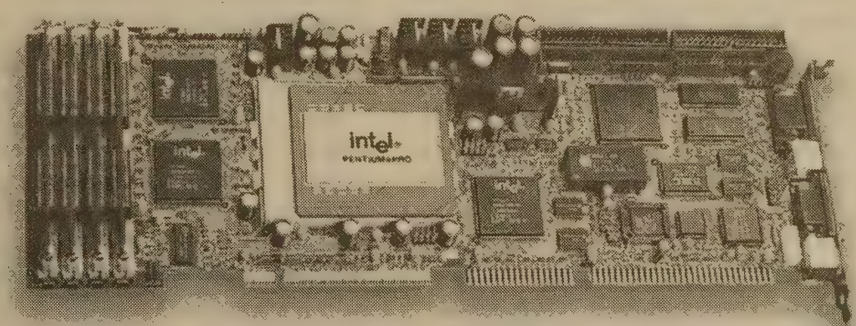

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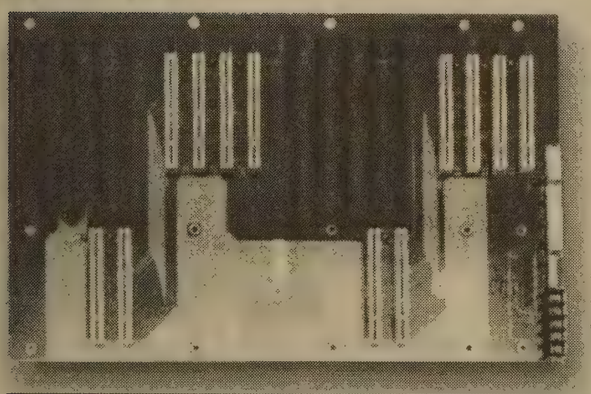

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REALIZABLE FANTASIES • BY JIM WARREN

The Evil Of Software Monopolies, Uh, Patents—Part 3

The Last Installment of Warren's Remarks To The Patent Office Opposing Software Patents

My previous two columns contained the first part of my formal testimony presented to the Patent and Trademark Office's hearings on "Software Related Inventions," held in San Jose, California, in March, 1994. Part 1 contained the "Principles" that I presented; Part 2 contained the "Pragmatics," and this concluding column contains the specific recommendations I made—all presented as the official position statement of Autodesk, Inc., which at the time, was the sixth-largest microcomputer software publisher in the world.

* * * * *

Specific Recommendations Opposing Software Patents

First and foremost, let us agree that those who hold software patents probably prefer patent protection, and those who spend their time and resources creating technical innovation and national progress—rather than creating patent applications and litigation—probably prefer unfettered freedom to innovate.

Let us also agree that **the constitutional intent is to "promote progress."**

So let us disregard who wants what for self-benefit, and act on principle.

We propose as a principle, that those processes that are exclusively intellectual and exclusively algorithmic—even when mimicked by machine—must not be monopolized.

These are Autodesk's implementing recommendations, and they are mine, stated as a deeply concerned computer professional and a multi-decade industry observer and entrepreneur. And they are supported by the vast majority of talented programmers I have known. (They are in less favor, however, with many of the intellectual-property attorneys I know—who do not create technical innovations, but are well-paid to patent them, threaten them and defend them.)

Recommendations

We offer two recommendations, the second having twelve parts—so to speak, the 12 Apostles of Redress:

First: Issue a finding that software, as I have defined it, implements intellectual processes that have no physical incarnation; processes that are exclusively analytical, intellectual, logical and algorithmic in nature. Use this finding plus the clearly stated constitutional intent ("to promote progress"), to declare that the Patent Office acted in error when it granted software patents. Declare that software patents monopolize intellectual and algorithmic processes, and also fail to fulfill the constitutional mandate to promote progress—that in fact, they clearly threaten it.

Declare that only the *representation* of such algorithmic intellectual processes—in human-readable or machine-readable form—is protectable, and then only by controlling the right to copy it.

Declare that software, as a mimic of the mind, cannot be patented.

As with Prohibition's speakeasys and the nation's unsuspecting nuclear-test subjects, this will create the problem of how to make whole those who hold erroneously issued patents. But that cannot justify continuing to patent intellectual processes. Repaying patent-holders can and should be resolved through the political process—although patent-holders cannot expect to retain their improperly granted monopolies of logic.

Like the rest of us, the government must accept the consequences of its errors and move to correct them.

Second: Until—and only until—software patents are definitively prohibited, reject or at least freeze all such applications that have not yet been granted, pending conclusive action on all of the following twelve recommendations:

1. Redress Serious Errors Of Previous Administrations: Issue a finding that there have been extensive and serious errors of judgment in a large percentage of software patents granted in the past, and immediately recall all software patents for re-review and possible revocation.

Encourage industry assistance by distributing summaries of all such patents to the top 20

> ***Let it be the responsibility of those seeking lengthy monopolies to defend the truly novel and truly non-obvious character of their innovations in a public patent-application review process. Do not continue to foist that responsibility onto all other practitioners.***

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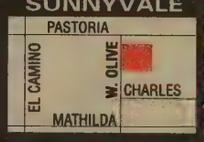

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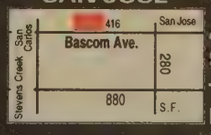

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or 50 or 100 software publishers and all other interested parties, requesting their examination and soliciting prior art and other challenges. This will probably require legislation to protect cooperating companies, lest they dare not participate for fear of later claims of "knowing infringement."

In addition, make the information available via the Internet and solicit maximum public input via that channel.

2. Mandate Disclosure Upon Filing: Issue a finding that it unconstitutionally suppresses progress to hide software threats in secret filings for one to five years, especially given that software products often have a development period measured in months and a life-span of one or a very few years. Note that most of the high-tech nations with which we compete require disclosure upon filing, or very soon thereafter.

Based on those findings, adopt a policy of disclosure upon filing, or at least within, say, ninety days of filing.

This will give software developers essential early warning of possible danger. It will also allow them to provide badly needed prior art before the Patent Office spends staff time on the application, and provide that prior art perhaps years before the patent might be granted and become a threat.

If a potential filer fears that such early disclosure will endanger trade-secret protection because the patent application may be rejected, so be it. Somehow, most of the rest of the world survives with disclosure-upon-filing.

Let it be the responsibility of those seeking lengthy monopolies to defend the truly novel and truly non-obvious character of their innovations in a public patent-application review process. Do not continue to foist that responsibility onto all other practitioners, who must now prove after-the-fact invalidity in costly, intolerably delay-ridden court defenses that leave as our only options paying unjustified ransoms, years of halted progress, and waste expended on defensive patent applications.

3. Require Disclosure Of Complete Source Code And Documentation Upon Filing: Reiterate that the major function of the patent system is to assure complete public disclosure of innovation in order that all may benefit and progress be promoted. Issue a finding that software patents require full disclosure of complete, original source code and complete internal documentation.

Then require its disclosure—preferably upon filing, or perhaps ninety days later, but at least upon the granting of a software patent. Note that this implements the "best mode" requirement.

Furthermore, find that software-patent disclosures in the past have often failed to fulfill this minimum requirement, and require such disclosures for all present software patents, to correct their improperly incomplete disclosures of the past. Patent-holders who decline to so disclose in a timely manner must have their patents invalidated by prompt Patent Office action.

continued on page 37

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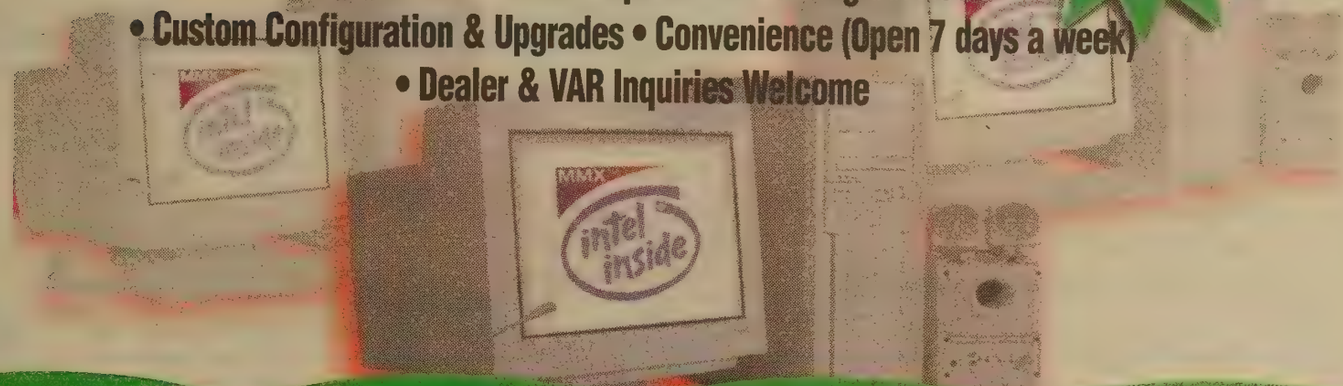

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- Sound Blaster 16 ❖ Amplified Speakers

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- 4MB VRAM Video ❖ 15" .28 NI Monitor
- 104 Enhanced Keyboard ❖ Mouse
- MS Windows 95 ❖ 24X CD-ROM
- Sound Blaster 16 ❖ Amplified Speakers
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- 1.44MB Floppy Drive ❖ 17" .28 NI Monitor
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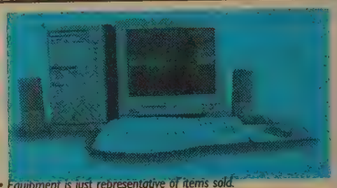

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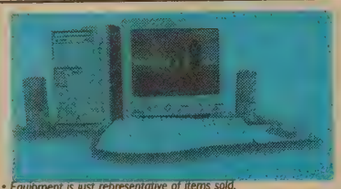

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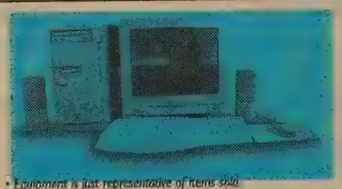

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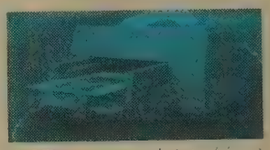

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Realizable Fantasies *continued from page 32*

4. Prohibit Filings After Any Public Exposure: Issue a finding that most of the nation's high-tech competitors, in Europe and elsewhere, prohibit patent filings after any public exposure of an innovation. Further find that patentable innovation in software is unclear; vaporware* is rampant; early disclosure is common; sharing of disclosed innovation is almost universal; and, possibly infringing development using such disclosures is almost inescapable. Use that finding to prohibit any filing after the date of *any* public exposure.

(—"vaporware" refers to products and innovations that are announced many months and even multiple years before they are finally delivered.)*

5. Reduce Requirements For Challenging Software Patents: Find that the evaluation of what constitutes new, novel and un-obvious innovation in software is highly subjective and essentially impossible for the Patent Office to judge, especially since the Office does not have available to it the fifty years of prior art that exists. Use that finding to change the standard for invalidating software patents, from a requirement for "clear and convincing" evidence, to no presumption of validity at all—which is usually the case if the experience of well-funded defendants such as Autodesk is any measure. At an absolute maximum, require no more than a "preponderance" of evidence.

6. Reduce Protection Period: Issue a finding that seventeen-year software patents are clearly unreasonable in an industry where (1) significant innovation can often be created in months; (2) most innovation has minimal costs relative to traditional inventions; (3) manufacturing and distribution are trivial; (4) products can be shipped within weeks of being finalized; (5) great profits can often be attained in less than a year; (6) the life of a product is typically only a few years; and (7) all of the growth of the industry—from inception to *Diamond v. Diehr* in 1981—was barely three times that seventeen-year monopoly period.

Therefore, shorten the one-time protection period for software patents from seventeen years to no more than, say, two years. *Sui generis* is justified.

7. Replace First-To-Invent With First-To-File: Issue a finding that this nation is almost alone in granting monopolies on the basis of first-to-invent, rather on first-to-file. If the patent system is justified and public disclosure has merit, then encourage it by awarding monopolies only on the basis of first-to-file—and disclose.

But, of course, retain the principle that prior art always invalidates a patent.

8. Declare That Useful Intellectual Communications Cannot Be Monopolized: Find that useful output from

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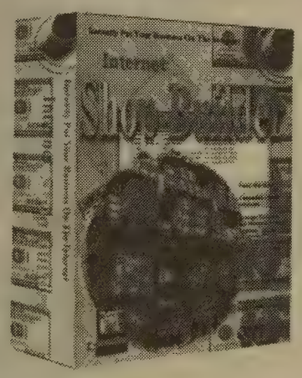

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computer programs, that does not primarily control equipment and is not primarily aesthetic or artistic in nature, is a response from an intellectual process; is thus the concluding part of an algorithmic and logical process; and may no more be patented than can any other part of the communications processes of the mind.

9. To Promote Continuing Progress, Mandate Cross-Licensing: If you are going to grant monopolies over our algorithmic processes, then at least mandate that we can use them under license from the monopolists.

State the irrefutable fact that essentially all software innovation to date, and all investment therein, and all of the nation's global leadership in this field of software, have all occurred without the driving force of patent monopolies. Thus, require mandatory cross-licensing of software patents in a manner that permits the patent holders to reap reasonable rewards, but avoids the clear and present danger that software patents will destroy the national leadership in this important industry, produce inferior products for the public, and otherwise impede progress. We suggest mandantory licensing rates not exceeding, say, 5% of a licensee's profits, prorated across all cross-licensers for a given product.

10. Provide A Nationally Accessible Prior-Art Collection: Create a public repository of the limited and incomplete amount of prior art that your Office can collect, with at least descriptions copied to every Federal Repository Library and updated monthly, and make it freely available via the Internet, to the extent such is technically possible. Facilitate and encourage submissions from all sources, and especially require inclusion of all software produced under any government grant.

If you don't have the resources to do it, then inform Congress that you are unable to perform your assigned functions without endangering national progress.

11. Exercise Much Greater Due Diligence With Regard To Software Patents: The Patent Office simply must perform more rigorous review before it issues software patents. If it insists on granting monopolies on algorithmic intellectual processes, then the Office must become much more than primarily an archivist. Given the chaos and cost you are creating in our industry, you must do much more than simply accept filings, conduct nominal research and then issue a patent, leaving it up to endless threats, defenses and court battles—among those who can afford them—to ascertain which few software patents might be valid, which is too often determined only by the relative wealth of the combatants.

12. Create A Large Public Advisory Body: Encourage and assist the creation of a

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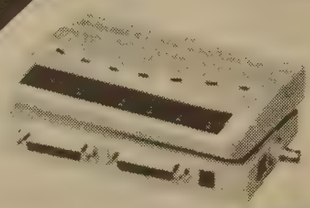

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Realizable Fantasies *continued...*

large advisory commission of volunteers who are technologists—those who produce the nation's progress in this area—not just intellectual-property attorneys. Seek them from a broad spectrum of software publishers, great and small producers, including individuals.

Technical innovators and their management have, basically, two options: They can invest some time and effort in correcting these intellectual-property protection-errors, or they can invest endlessly in documenting and filing defensive software patents, reviewing other's patents for threats against their creativity, and in ever-escalating claims, defenses, ransom payments, depositions and court hearings.

Among other things, ask that the advisory commission participate, from the beginning, in the drafting of any legislation on this matter, proposed by your Office. And request their assistance with needed legislative efforts.

Require mandatory cross-licensing of software patents in a manner that permits the patent holders to reap reasonable rewards, but avoids the clear and present danger that software patents will destroy the national leadership in this important industry, produce inferior products for the public, and otherwise impede progress.

Conclusions

These specific recommendations will require political support to obtain needed congressional action, and this industry has been politically asleep. But continuing software-patent debacles are beginning to awaken it—most especially its innovators. And we certainly have the financial resources, communications tools and tenacity to seek effective redress—as we finally organize and choose to act.

However, the needed congressional action can be greatly facilitated by supportive recommendations from your Office. Please draft them soon—not cloistered inside the Washington Beltway, but with extensive Internet circulation of all drafts and discussion.

But, to best promote the nation's progress, reward innovative algorithms, benefit investors, enhance the economy, create and protect high-wage jobs, and permit continuing global leadership—refute software patents.

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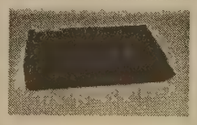

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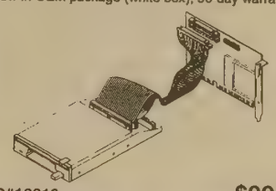

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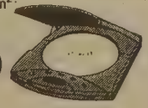

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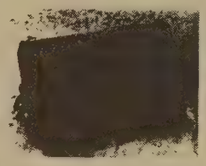

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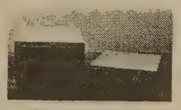

16575 16960

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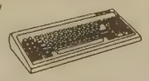

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Letters

Microsoft Vs. DOJ—The Debate Goes On

Double Standard?

Why should Microsoft not have the right to define what should be included in their operating system? They are the ones who have to sell it and they are the ones who will suffer the losses if they cannot sell it.

Should Uncle Sam forbid WordPerfect from including a spreadsheet and a file manager in their "word processor?" Was WordPerfect using its "monopoly" to enter the spreadsheet market? Why didn't the DOJ investigate WordPerfect's "monopolistic practices?"

There is no question that the DOJ is singling out Microsoft for harassment. After all, Netscape has been giving away their browsers for years (I for one have been using version 1 through 4 without paying a single cent). Netscape is also, according to a recent *PC Week* report, trying to turn Communicator into a platform.

Not too long ago, Netscape had a "monopoly" of its own in the browser market. So why is it OK for Netscape to use its browser "monopoly" to enter the OS market but it is not OK for Microsoft to use its OS "monopoly" to enter the browser market?

Not too long ago, the DOJ was investigating MS for bundling the MSN, even though Apple had been bundling eWorld with impunity. Double standard? You bet!

Nameless email correspondent

Stop The Monopoly!

It should be obvious to even the most casual observer that the Microsoft monopoly in the world of personal computers should be ended. Microsoft's increasingly strong monopoly began in the 1980s with their version of the Disk Operating System (DOS) and progressed with the introduction of Windows 3 and then Windows 95.

First, Microsoft pushed out the then-dominant spreadsheet software, 1-2-3, produced by Lotus Corp., and replaced it with their own Excel. Then they pushed out the then-dominant word-processing programs, WordPerfect, produced by WordPerfect Corp. and WordStar, produced by MicroPro International Corp. and replaced them both with their own MS Word software.

They did this by "bundling" their software applications, Excel and Word, in a package along with their Windows operating system, which they forced computer manufacturers to accept on an "all or nothing" basis. This activity was obviously a restraint of trade and free competition, but the Republican Reagan and Bush administrations were not interested in enforcing the existing anti-trust regulations. In the go-go 1980s, this lack of competition and lack of a level playing field for software developers was ignored or winked at.

Now Microsoft Corp. is trying to leverage its dominant Windows PC operating system into a domination of Web browsers and other functions on the Internet. It clearly violated its 1995 consent agreement with the US Department of Justice by forcing computer manufacturers to buy its Web browser when they purchase the Windows 95 operating system.

It is high time for the Department of Justice to say "No more monopoly tactics" to the arrogant Microsoft Corp. Here is a corporation that is so greedy that it is resisting tooth-and-nail paying any benefits to long-term contract employees. Every corporation in America has a state charter that requires it to serve the public interest. This corporation is no longer serving the public interest and is violating its state charter.

I believe that Microsoft Corp. should be broken up into smaller, competitive companies, just as the Standard Oil Trust was broken up back in 1911. There could be a Windows Corp., a Word Corp., an Excel Corp. and a Microsoft Internet Corp. It is no longer tolerable to let the monopolistic Microsoft Corp. keep extending its grasp into more and more areas of our computerized economy.

James K. Sayre

Complexities

Although the current Justice Department suit has brought to light some of Microsoft's more "arcane" dealings, especially in terms of sales practices, I think there is a larger point being missed by the press.

While Microsoft would have a difficult time asserting that, say, a word processor or a paint program is part of the operating system, I don't believe that carries over to the HTML browser.

To assert that *any* program is "part" of the operating system, you would have to offer proof that the operating system needs that to perform basic functions. Just because the command can be *added*, this does not de facto prove that the function or program is not part of the operating system.

For example, Symantec and others provide extension programs to, say, show the disk space remaining, in a graphical and interesting way. But this still remains a vital feature of the operating system, such that a user without that function might be compromised.

In the case of the HTML browser, a document type is being introduced to general use that requires a special program to view. It is debatable if a system is "compromised" by its inability to read such a file right out of the box. However, since HTML files are becoming more popular, it seems obvious that Microsoft would want to add that function at a basic level to the operating system.

The final nail to this argument, in my opinion, is the Windows "help" file format. The purpose of the help file format is practically identical to that of HTML. It gives presentation-level text and images that free-flow to adjust to different window sizes, menu options, etc.

The browser itself copied HTML from SGML, intended to be a general purpose formatting language. So HTML is moving to become the standard for interactive displayed text and images. And it makes every kind of sense that Microsoft might want to find sources of text and other presentation data in the operating system,

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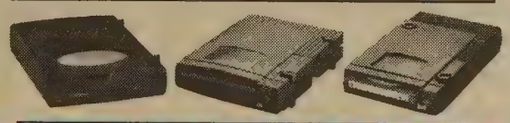

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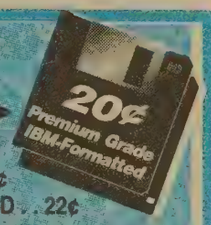

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Letters *continued...*

including help format files and other documents, and convert them to a unified document language.

Far from closing the Windows operating system to independent developers, standardizing on an HTML format file will help them by not requiring special "kits" or procedures to create help and other files. Further, because a standard file format is used, it will no longer be necessary to *only* use Microsoft utilities to read these common files. Developers will be able to shop for help formatting utilities. Users will be able to replace the help reader with an alternative, perhaps from Netscape.

It is unfortunate that this has become a fight over Microsoft sales practices. I don't doubt that Microsoft plays hardball. Salesmen are generally trained to take every advantage, and given such incentives it is surprising that the law is not broken more often.

But there *are* sound reasons for including at least an HTML reader into the operating system, and I hope that work goes forward after the dust clears.

Scott A. Moore
Cisco Systems

In Other News: Africa—More Bandwidth Needed

From Royal Farros's column on the Internet in Africa (#174), I quote:

"Everyone is excited about the Internet in Africa... Disclaimer: When I say 'everyone,' I mean 'people involved in the tourist trade.' By definition, these are individuals who have a job and some education, and aren't (actively) involved in a war."

Huh? How long are we (people of African descent) to tolerate and have to deal with such ignorance? Mr. Farros' technical pedigree may be first rate, but his musings in regards to "everyone" in Africa are inexcusable. I think readers would be better served by picking up *Wired* 6.01 and read "Africa Rising" by John Perry Barlow.

Mr. Farros' visit and perceptions of South Africa are representative of South Africa and should not be, in this forum, projected onto the whole of the continent. Sites such as *http://www.ghana.com* are evidence that Africa is not all spear-chucking, un-wired cannibals on the Serengeti as Mr. Farros would have us believe. In fact, I myself regularly correspond with friends in Africa via email who are not in the "tourist industry." They are not in "war," they work, and are educated.

Africa's problems may seem cute when viewed from afar, but for those of us with loved ones on the continent it is not funny to see someone with a large readership poke fun.

Jason Harris

Although it should go without saying that we intended no disrespect or trivialization of Africa's people or complexities, we most sincerely apologize to Mr. Harris and any others who were offended by our infelicitous phrasing.

—ME

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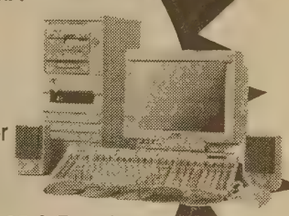

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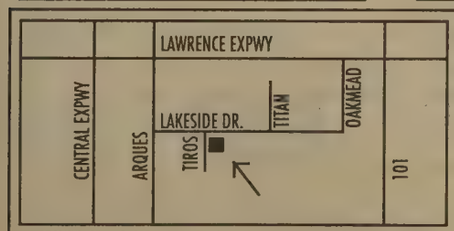

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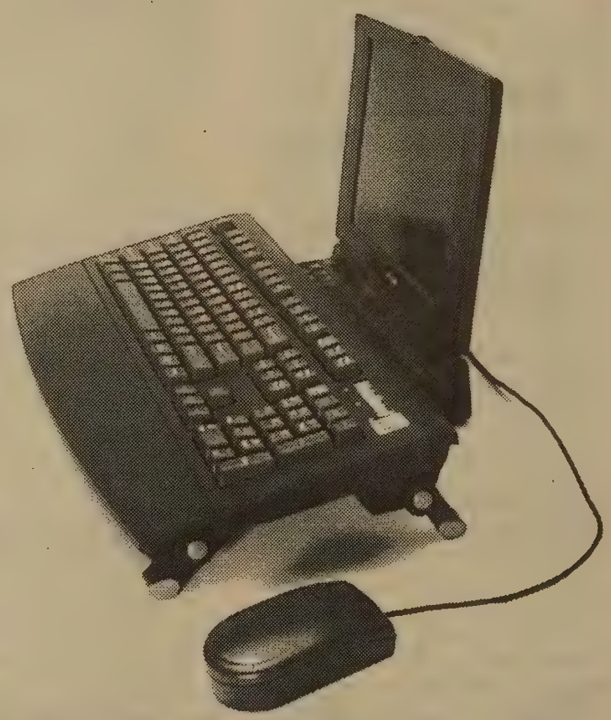
Keyboards And Their Cousins

Darwin Keyboard's NoteBoard

Keyboards have consistently been the one major limitation with laptops. While I do not fault most of the laptop manufacturers, I still find that nothing can beat a good, full-size keyboard. Of course, when you are on the go there is no practical alternative to a laptops built-in keyboard. But when you are working at your primary workspace, it is a real advantage to have a good keyboard. After all, the two main interfaces you have with your computer are the keyboard and the display.

Almost any PS/2 keyboard will do the job, with some brands available for less than $20. And while we are criticizing laptops, I must also weigh in on the side of a mouse rather than either a touchpad or a trackpoint pointing device. I find that I can navigate much more rapidly with a conventional mouse or a variation of one than with the devices that are coming on almost all of the laptops these days. So while you are considering a standalone keyboard, you may as well add a mouse for your primary location. When on-the-go, we have to make compromises, but I can no longer say that I like either the built-in keyboards or pointing devices as well as what is standard fare for a desktop computer.

In my office, I do everything I can to get away from these limitations and restore the system to a reasonable facsimile of a traditional desktop computer. The addition of a decent keyboard, however, pushes the laptop farther away from my eyes and makes the display all the harder to read. Darwin Keyboards recently addressed the whole business of an add-on keyboard for laptops with the introduction of their NoteBoard package—a full-size keyboard, a matching serial mouse and software that lets you customize the keyboard.



The basic NoteBoard is a decent keyboard. It is similar in layout to most good PS/2 keyboards. It stands out, however, in that it is designed specifically to accommodate the needs of laptop users. It has feet that are adjustable to six different heights so you can raise the keyboard high enough to allow the body of the laptop to slide under the NoteBoard. In this way, you will neither have to use a lot of desk space for the add-on keyboard nor have the LCD display so far away from your eyes.

The concept is good. In practice, however, I was only partly pleased with the results. In my case, I am using a laptop that is unusually big and the legs on the NoteBoard simply were not tall enough to accommodate my machine. Darwin has thought of this and offers leg extensions upon request. The problem, however, is that the keyboard is then too high for me to type comfortably. My solution was to use the NoteBoard in front of my laptop, which partially defeats the purpose of its carefully thought-out design. If you have a reasonably sized laptop, I would expect this keyboard to work perfectly. I am pleased with both the layout as well as the touch and feel of the keyboard. Bear in mind, however, that there is hardly any part of the computer as personal as the keyboard. What feels great to one user may not to another. I suspect that some users may find this keyboard equal to the best they have ever used, while others may find it only average. In any case, it is good enough for the vast majority of users.

continued on page 50

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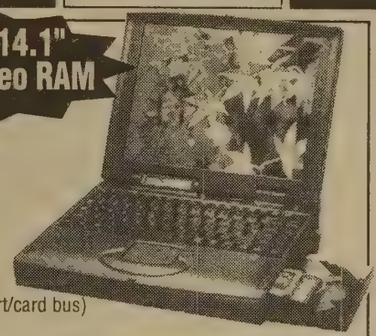

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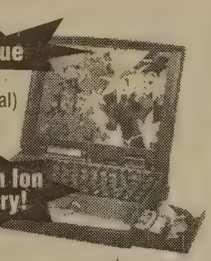

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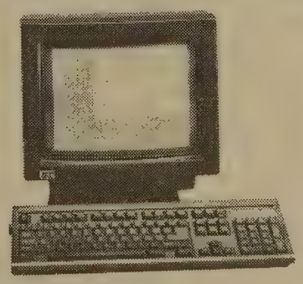

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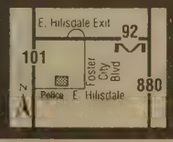

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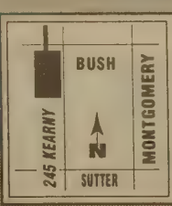

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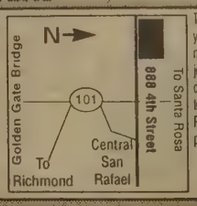

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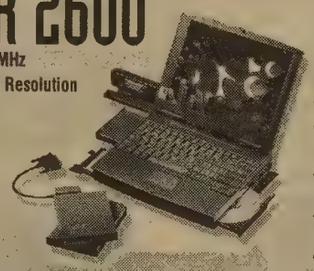

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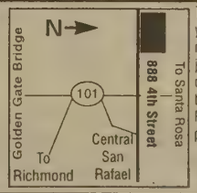

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Laptops *continued from page 46*

A mouse is a pretty standard piece of equipment and will work with virtually any laptop. After struggling with a touchpad for too long, I was delighted to switch back to the mouse. My preference, of late, however, has been the Microsoft IntelliMouse ($84.95). This mouse, which has been out for some time, works especially well with Microsoft software. It has a wheel that lets you easily scroll back and forth through documents, spreadsheets and directories. In addition, you can zoom in and out with the wheel and a final feature that I love is its teleprompter mode, which lets you automatically scroll through a document at any speed you like. It's great for proofreading.

The advantage of the mouse Darwin includes with the NoteBoard is that it connects through the serial port rather than a PS/2 port. Many laptops have only one PS/2 port, which means you may have to choose between an add-on keyboard and a mouse. Darwin's package is a good solution.

The final component of the NoteBoard package is the LaunchBoard software, which lets you customize the keyboard. You can, for instance, set it up so your function keys take you directly to the Web sites you like or open programs or documents that you use frequently. In addition, there is a macro feature to the software for creating sophisticated software applications that will open and close programs and perform functions you repeat.

Other manufacturers are also recognizing the limitations of laptop keyboards. Fujitsu Takamisawa America has just come out with a numeric keypad specifically designed for laptops. The keypad plugs into a PS/2 port and also has a pass-through PS/2 port that lets you can connect a mouse to the keypad. This device is targeted primarily to on-the-go users. In your primary location, you may as well use a good keyboard like the NoteBoard that has a full numeric keypad. On the road, however, this keypad will be a great convenience for number crunchers. If you are working with spreadsheets or other number-intensive applications, this sure beats imbedded numeric keypads or the row of numbers across the top of the keyboard.

While laptops are terrific, the addition of aftermarket products can improve the performance of these little wonders on-the-road and at home.

RESOURCES:

NoteBoard with NoteMouse, $119.95
Darwin Keyboards
915 Bryant St.
San Francisco, CA 94103
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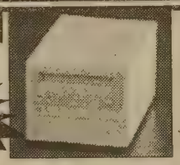

*WANGDAT-3100	2 GB	$517
*ARCHIVE 4322	2-4 GB	$573
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*CDT 8000	4-8 GB	$797
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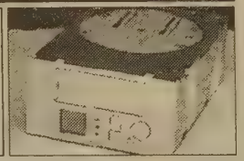

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EXB 8500C	5-10 GB	$997
EXB 8505	5-10 GB	$1227
EXB 8505XL	7-14 GB	$1577
*EXB 8700	14 GB	$695
EXB 8900	20-40 GB	$2927
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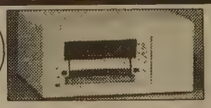

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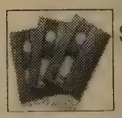

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Computer Of The Month

Micro Express' Multimedia NP8200MMX

Micro Express computers have consistently delighted me over the years. Its newest laptop—the NP8200MMX—is an impressive computer at any price, but for under $3,000 it is amazing. This is a hefty laptop, weighing 8.4 lbs. and measuring 9.1" x 11.9" x 2.2." Laptop buyers have to carefully consider just what they want out of a system that they purchase. For myself, rarely working in airplanes, I value portability, but prefer the larger laptops like this one because of the extra ease-of-use offered.

The NP8200MMX offers a large, 13.3" active-matrix color display and a well-designed keyboard. But in addition, it is a powerhouse, sporting a Pentium 200MHz MMX CPU. It comes standard with 24MB of RAM, upgradable to either 32MB (extra $60) or 64MB (extra $199). It has a removable 2.1GB hard drive. In addition, it includes a 20X CD-ROM drive as well as the standard floppy drive.

This computer is marketed as a multimedia computer and it fills the bill admirably. While the large screen is excellent, I still prefer an external monitor when I am working in my office. For making presentations, you can easily connect it to a television through the output on the back. Like many portables, this one requires you to choose between connecting a keyboard or a mouse if you are using the PS/2 port. In order to add both an external mouse and keyboard, you will need to use a serial mouse. The built-in touchpad is good enough for when you are traveling, but no match for a comfortable mouse.

The MP8200MMX is an impressive computer at any price, but for under $3,000 it is amazing.

While most good portables offer modularity, Micro Express takes the concept farther than many of the others on the market. The NP8200MMX comes with a lithium-ion battery that should provide power for a couple of hours. Additionally, you can replace the floppy drive with a second battery, which also is included with the computer. Replacement batteries ($199) are available. If you fill the floppy bay with a second battery, you can still access the floppy drive by connecting it to the parallel port with the provided cable. If you do most of your work using AC power, you might want to consider an internal AC adapter ($149). This adapter replaces the primary lithium-ion battery and eliminates the need for the standard external power supply that comes with the laptop.

The CD-ROM can be swapped with either a magneto-optical drive ($349) or a second hard drive ($285-$399). Magneto-optical drives are becoming an attractive option for backups. The CD-ROM drive is only part of the multimedia package. There is a built-in microphone and two speakers. In addition, there are line-in, microphone, headphone/speaker ports and a volume-control knob on the side of the machine. A MIDI/game port on the back of the unit will serve those who work with music files or are addicted to games. The sound system is Sound Blaster-compatible.

A pair of PC Card slots add to the multimedia capabilities as well as provide a convenient way of extending the interfaces of the computer. The lower PC Card slot supports Zoomed Video. This allows you

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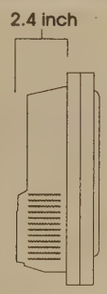
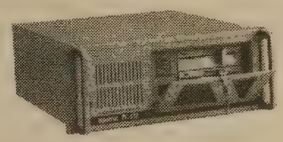


Features

- 10.4" TFT LCD Display (640 x480)
- 3x RS-232 and 1 x RS-232/422/485 communication capabilities
- 4 isolated input and output channels
- 10 Base-T Ethernet Interface
- Spill-resistant front panels (NEMA 4/12)

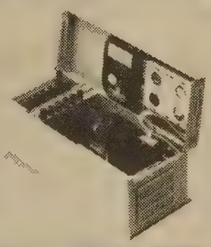
IPC-610 Rackmount Industrial PC



- 14-slot ISA/PCI backplane
- Baby AT version available
- Supports two 5.25" and two 3.5" disk drives
- 250W Power Supply

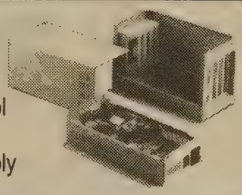
IPC-6806 Compact Wall Mount PC

- 6-slot ISA/PCI backplane
- Supports two drives
- Cooling fan with air filter
- 150W Power Supply

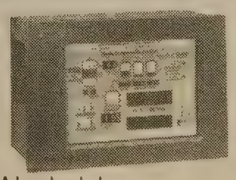


MBPC-641 MicroBox PC

- 4-slot ISA-bus backplane
- Ultra compact for embedded control
- Cooling fan
- 65W Power Supply

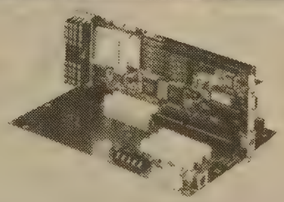


MiPC-51 Workstation w/TFT LCD Display



- 4-slot ISA bus backplane
- Supports two 3.5" drives
- 640x480 TFT Color LCD
- 65W Power Supply

CPU cards



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Laptops *continued...*

to obtain the best images from a CD-ROM, provided your system is set up properly. All of the necessary drivers are included with the system. When the two slots are used together, they will accommodate a Type III PC Card. Micro Express includes a Type II 33.6Kbps fax/modem with this system. I prefer this approach to built-in modems, which will most likely soon be out-of-date and are expensive to change.

An infrared port offers another option for moving files to either a printer or another computer. Finally, there is a USB port. While I see few peripherals that use this port, I have been told that this port will become increasingly important in the future as new computers are similarily equipped.

The documentation that comes with this laptop is wonderful. While you can read it and learn what you need to know even if you are inexperienced, there is also a wealth of technical information for those who need to know these details as well. The manual is put together in such a way that either kind of reader will be comfortable. If you need support beyond what is provided by the documentation, there is a 24-hour telephone number you can call. Micro Express provides a full four-year warranty on parts and labor. And finally, a carrying case rounds out the package. ■

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This computer is marketed as a multimedia computer and it fills the bill admirably.

RESOURCES:

NP8200MMX Notebook Computer, $2,999
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BY ROYAL P. FARROS

The Making Of An Internet Startup—Part XVI

Venture In The Valley

We continue our elongated discussion about venture capital in the Valley with some random but important topics.

Please, Sir, May I Have Another?

As protection against investment risk—and *all* start-ups have investment risk—a VC will have you sign a rather brief (by legal contract standards) Term Sheet that's used as an outline for a more monstrous Purchase Agreement.

Make sure you know what every line in the Term Sheet means. *Every line.* You'll find a mixture of tough terms and *really* tough terms. You'll feel like saying, "Please, Sir, may I have another?"

But don't. Rather, pretend you're putting money into a business professional that you've recently met but don't really know. Pretend you've put money into other business professionals and haven't gotten a penny back. You'll soon come to the conclusion that caution, more than greed, drives the successful venture capitalist.

But why pretend? Why not actually invest some of your *own* money in your business? Doing so does two really great things: (1) Putting your "money where your mouth is" will always impress your investing partner, and (2) you'll have a greater sensitivity to terms that are tough and fair vs. tough and abusive.

Let's Talk Terms

Here's a secret: Not everything a VC *says* is standard in a Term Sheet *is* standard. Sometimes, a VC only *hopes* it becomes standard, as if saying it enough might make it so.

Knowing what is standard and what is simply *common* is critical: You can't negotiate away standard provisions; however, you have some latitude with the common ones.

Here is something that's standard but seems wacky: It's standard for the company receiving money to pay the legal fees of the investors. That means you're paying your legal fees *and* theirs. The people with the *least* amount of money pick up the tab for everyone. Go figure. But, it's *not* standard that you have to pick up their *entire* amount. Don't let a VC push you over a $10K cap. (Magically, the legal fees from our investors came in at $10,400. Amazing coincidence, huh?)

How do you know the difference between standard and merely common terms? You do your homework. You ask a lot of questions to people who know what's what. Your lawyer is a candidate here. Entrepreneurs who have been through the process are, too. If you have a great friend who is/was in the venture business, so much the better.

Don't just ask questions, but do a little reading, too. (Uhm, I guess that's what you're doing now.)

There are some great "How To" books out there that cover this topic, like *Engineering Your Start-Up* by Michael Baird. The great part about references like this is they will teach you *the language* of venture financing, the first step to understanding the venture world.

After talking to enough people, you'll learn about "antidilution" protection and why it's considered standard in a Term Sheet. You'll also find out about "participating preferences" and why, even though VCs will tell you they're standard operating procedure, they aren't.

NOTICE I HAVEN'T SAID, "DO YOU HAVE A GREAT IDEA?" THAT'S BECAUSE EVERYONE AT THIS LEVEL IS SUPPOSED TO HAVE A BILLION-DOLLAR IDEA. YOU CAN'T EVEN START THE PROCESS WITHOUT ONE.

How Much Is That Doggie In The Window?

What's your company worth? Finally, the $64 question. The answer: "It depends."

Do you have a successful track record? You get big bonus points for this. Have you assembled an experienced team? More bonus points. Have you eliminated technical risk (i.e., do you have a product)? Add more points. Have you eliminated marketing and sales risks (i.e., do you have product reviews, a brand-name, customers, and all-important revenues)? Add potentially lots more points.

If you're in a "hot" area—for example, everyone's jumping on the e-commerce bandwagon today—you'll see even more dollar signs in a VC's eyes. (You won't find too many VCs in Silicon Valley investing in packing materials. . . or desktop word processors.)

Notice I haven't said, "Do you have a great idea?" That's because everyone at this level is supposed to have a billion-dollar idea. You can't even start the process without one.

How does all of this translate into a cold, hard number? Before I throw out some ranges, one last disclaimer: Every period in venture history is different. Valuations today are multiples higher than they were just a few years back. Valuations a few years from now might be a few multiples lower.

The Making Of An Internet Startup *continued...*

Practically speaking for an e-commerce venture, if you've been part of a previous success at a reasonably high level, then, with a thoughtful business plan, you might see a $500K–$3 million valuation. If you have little-to-no senior experience, valuations can be $50K–$500K. If you have a team together and some significant time into a proprietary product or process that people are getting excited about, you could see a valuation move up to the $3–$6 million range. And if you're actually selling the product, getting great reviews, and generally seeing all the important measures of a business move up the hockey stick, a business can be valued anywhere from $6 million to $14 million.

Of course, your business could be worth a whole lot less. Or more. It really depends on whether you can find anyone to buy into your story.

The Business Plan

The hardest part about doing a business plan is that no one will read it. Check that... people will *maybe* read the *one-page* executive summary (any longer and you've lost your audience) and the summary financial projections.

However, as everyone will tell you, the process of doing a business plan, including detailed financial projections, is important because it helps *you* organize your thoughts. If you can't do a business plan and financial projections, can you really build a business?

THE PRESENTATION IS YOUR *MOST IMPORTANT* TOOL IN RAISING MONEY. NAIL IT AND THE PROCESS JUST GOT AN ORDER OF MAGNITUDE EASIER. BLOW IT AND YOU'LL FIND YOURSELF BACK ON THE ANGEL CIRCUIT.

Still, don't waste valuable time: Keep the business plan short and to the point.

Doing a business plan does one other great thing: It helps you create a well-thought-through outline presentation of your business, something that hits on the "who, what, why, how, and how big" of your business. Don't exhaust yourself with the business plan and do a half-assed job on the presentation: The presentation is your *most important* tool in raising money. Nail it and the process just got an order of magnitude easier. Blow it and you'll find yourself back on the Angel circuit.

(One last tip: Never say, "So if the market size is $100 billion and we get just 0.5% of this market..." Even though venture people will do this calculation themselves, they *hate* it when an entrepreneur uses this back-of-the-envelope thinking.)

To Be Continued... Yet Again

Since the venture process is so critical to any start-up, we've taken the long approach in this series. We'll wrap up in the next article, though, by discussing the dangers of getting too high of a valuation, positioning yourself with venture "alternatives," and contemplating how venture will change your life forever. ■

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SMALL OFFICE/HOME OFFICE • BY BIRRELL WALSH

May I Have This Dance?

Creating Temporary Federations, Task Forces, And Joint Ventures With Other Small Businesses

One moment you don't know them; the next moment you are in a major project with them. This is the sort of short-term, project-based operation we are all suddenly involved in these days. Originally only large businesses created such joint ventures. Now everyone is doing it. How can we learn to dance, so we can handle changing partners with some grace?

We might have a convention to produce. We hire a company to handle setting up the booths. We rent a building where the convention can happen. We enter a joint venture with Evelyn, who provides trained staff for events like this. We call Joe, to whom we owe a favor, and he signs on as the caterer. Our client wants to be in touch all the time, to see how the convention is coming along. So does their PR firm.

This is how the future of small business will be, it seems to me. We will be many, many small businesses making temporary federations and then dissolving them. We will need quickly to find compatible organizations, smoothly to integrate with them for a project, and then graciously to part with them. Each of these processes calls for software tools.

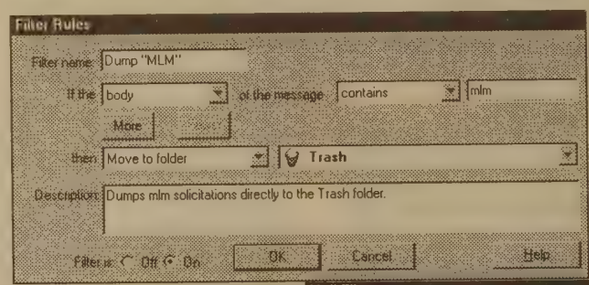
There might be one or two large corporations in this mix, and a dozen small businesses. Legally we may be joint-venture partners, clients, independent contractors, even temporary employees. Yet for a while we all have to act as if we were one company. How do we create the communications infrastructure that will let us work together?

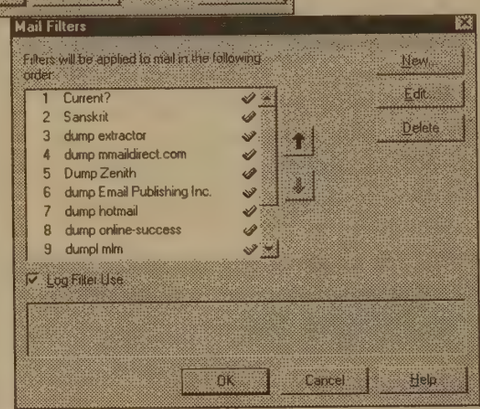
This month's column is a discussion of some of the tools now available from just two companies—Quarterdeck and Netscape—and an invitation to other providers to tell us about more.

Finding Partners

Problem: To a large extent we choose to work with people we know. We call Evelyn or Joe because we have worked with them before, and we know how they perform.

But what if we need to find a partner in Delhi? We want someone who is technically savvy and who does translations into the languages of India. Where do we turn? If we know somebody in Delhi, we might call and ask them. If we know somebody from North India, we might ask them. But if we don't, we are likely to turn to the Web. We need a tool that will take our criteria and search the Web for us.





Sample Solution: My current favorite in this category is WebCompass, from Quarterdeck. It was reviewed in issue 166 of *MicroTimes*, an article to visit if you are looking for a Web-search tool. That's *http://www.microtimes.com/166/soho.html*.

WebCompass takes any criteria that you may give it and goes out on the Web by itself. It sends requests on your behalf to dozens of search engines, and returns with the addresses of all pages which may match your needs. Then it takes a deep breath, and sends for the pages themselves. It summarizes each page with a pretty-good artificial intelligence program. Then it does its best to rank the pages by their degree of match to your needs. It will also repeat the search and update it automatically on any calendar you want.

Products Needed: We need even better Web-search tools, of course. Quarterdeck is planning a new release of WebCompass in the spring. But we also need services. We need matchmakers who will connect small companies who are looking for partners. We need directories of those services. And we very much need evaluators. *Consumer Reports* has made its reputation by even-handedly evaluating all kinds of consumer products. We need online services that evaluate potential short-term partners.

Integration

Problem: When you have joined with another small business, you need a way to integrate your operations. You need to be able to route messages, exchange documents, "sympathize your watches," and arrange online meetings.

Sample Solution: One of the main problems in any collaborative project is the routing of email. It's not so bad when you have just a few things going on, but when there are dozens of

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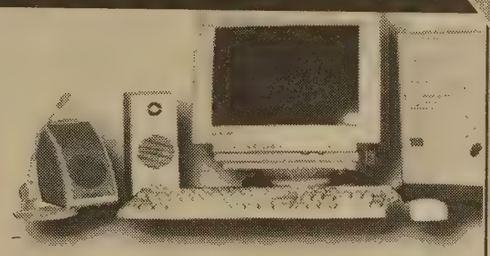

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people at work and each is sending out messages, you need a way to sort them.

Did you know you can build filters to pre-read your email and sort it? I use Netscape Navigator in its fourth version, a part of the Communicator. Under the "file" menu of Netscape mail it has "mail filters." This is a gateway to considerable power in pre-reading your mail, and getting (some) control over message traffic.

When you open up the "mail filters" item, you are invited to create a new filter. The process is pretty much self-explanatory. You are asked to name the filter. Then you are asked to create a rule. The form is, "If the W of the message X's Y, then do Z." The W's can be sender, subject, body, date, priority, and recipients. The verb (X) can be "contains," "doesn't contain," "is," "isn't," "begins with" or "ends with." What it looks for (Y) can be any text. And the possible actions include moving to a certain folder, changing the priority, marking the message as read, watching the thread, ignoring the thread, or just deleting the message.

A major problem in any email system is the unsolicited message. My favorite filter, so far, is "If the contains any hint of being spam, then move the message to the Trash." Every time I get a new message that might be spam, I now read it with enthusiasm, looking for clues. Does it say "mlm" (for Multi-Level Marketing)? Off to the recycler! Does it come from known spam-sites? Shred it! I have created filters to fling any message that contain six different clues to spam-hood.

This same kind of filtering is ideal for sorting project mail. You can get everyone to agree that the subject line of each message will say what part of the project it relates to. Then you can build filters that automatically presort the mail into mail-folders that deal with different aspects of the task force. Filters can also assign priorities to mail.

This is the future of small business:
We will be many, many small businesses making temporary federations and then dissolving them. We will need to find compatible organizations quickly, to integrate with them for a project smoothly, and then to part with them graciously.

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- Intel Pentium® 166/200/233MHz MMX $119/229/299
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- Sony 17" 200SF2 .25 . . . .$619
- ViewSonic 15GS 15" 1280x1024 .28 . . . .$299
- ViewSonic PT775 17" 1600x1280 .25 . . . .$649
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MOTHERBOARDS

- ASUS P2L 97 440LX Pentium® II 233-333MHz $189
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- ISA/PCI Ethernet Card (Combo) $19/25
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- Microsoft Office 97* $149
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- ATI 3D Xpression+ PCI TV4MB $99
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- Diamond Stealth 3D 2000 PCI 2MB $69
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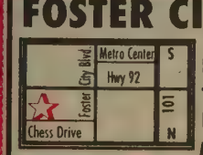

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Finally, the Netscape filtering system can serve as a hunting dog on the Usenet. There are valuable pieces of information on the news, but who has time to read them all? The same is true of mailing lists. You can have filters survey threads in a mailing list or Usenet. If the filters find a keyword you are interested in, they can mark the thread to be watched and move the message to a "possibly interesting" folder.

You can have more than one criterion in a filter. One interesting use is code-marking. This is of great help when email communications are not secure. You can create an agreement with a correspondent by which any real message will have (say) the word "the" in the subject and the word "isn't" in the body. Both of these are common in messages and will draw little attention. You can then send dozens of messages, most of which have false information. But only if both code-marks are present will your filter catch the message and send it off to a special "real message" folder. All other messages from that sender can just as automatically be placed in a "spurious message" folder. An outsider will be able to watch the messages go by, and even read them, but will not know which ones are genuine.

A major problem in any email system is the unsolicited message.

My favorite filter, so far, is "If the contains any hint of being spam, then move the message to the Trash."

While writing this column I spoke to Tawana Clark, the PR person at Quarterdeck; she suggested another solution for managing project communications: Procomm Plus 32. Ordinarily I put software through its paces before recommending it, but the deadline looms. I will just tell you what Procomm is supposed to do. It is apparently a truly complete communications package. It contains an email system, a browser (they use Microsoft's Internet Explorer), a fax system, optical character recognition for those faxes, a terminal emulator for thirty-six different terminal protocols, FTP for tranferring files, Telnet, a Remote Control system to operate a distant computer from your own—and a scripting language that is capable of starting and running other Windows and NT applications as well as controlling all the features of Procomm. With this program you could design a fully customized communication system. Then, after your joint venture used it, you could sell the design to others.

Can Procomm really deliver all this? If it were any other program, I would doubt the claim—but Procomm has more than ten years of being a top-of-the-line communications package. I can say the fax system works—I opened that and tried it right away. And the price for all this? $149. That is a remarkable deal.

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E-mail address (continued)

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What Is Your Purchase Time Frame? ○ 1 Week ○ 3 Weeks ○ 2 Weeks ○ 4 Weeks

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○ PC NOTEBOOK ○ Network FILESERVER
○ MACINTOSH NOTEBOOK

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Step 1: Enter PC System Brand Name & Model #. If Preference

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Quantity / Choices ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ 10 or More ○

My Budget For System Is ○ Under $1000 ○ $1000 to $1999 ○ $2000 to $2999 ○ $3000 to $3999 ○ $4000 to $4999 ○ Over $5000

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STEP TWO: SYSTEM CONFIGURATION: ○ INTEL ○ PENTIUM ○ PENTIUM MMX ○ PENTIUM PRO ○ PENTIUM II ○ DUAL CPU'S ○ MACINTOSH ○ MACPOWER BOOK ○ MacCLONE ○ AMD ○ CYRIX

CPU MHz & SPEED: ○ 5X86 ○ 6X86 ○ K-6 ○ Quadra ○ PowerPC
○ 266 ○ 233 ○ 200 ○ 180 ○ 166 ○ 150 ○ 133 ○ 120 ○ 100

BUS TYPE: ○ PCI ○ VLB ○ EISA ○ ISA

CACHE: ○ 64K ○ 128K ○ 256K ○ 512K

RAM: ○ EDO ○ SRAM ○ 4MB ○ 8MB ○ 16MB ○ 32MB ○ 64MB ○ 128MB

HARD DISK DRIVE: ○ 100MB+ ○ 800MB+ ○ 1GB+ ○ 2.5GB+ ○ 4GB+
○ IDE ○ SCSI ○ ZIP DR ○ JAZZ ○ 2GB+ ○ 3GB+ ○ 6GB+

MONITOR: ○ SVGA ○ VGA ○ MONO ○ 26 DPI
○ 14" ○ 15" ○ 17" ○ Non Interlace ○ 28 DPI
○ 20" ○ 21" ○ Multisync

FLOPPY DRIVE: ○ 1.44MB and/or ○ 1.2MB

FAX MODEM: ○ Internal ○ External ○ 33600bps ○ 56000bps ○ 28800bps

CASE TYPE: ○ Mid Tower ○ Desktop ○ Full Tower

VIDEO CARD RAM ○ 512KB ○ 1MB ○ 2MB ○ 3MB ○ 4MB

POINTING INPUT DEVICES: ○ Any Mouse ○ MS Mouse ○ Keyboard ○ Serial ○ Bus ○ PS2 ○ Trackball ○ Joystick ○ Ball Point ○ Pen

OPERATING SYSTEM NEEDED: ○ Windows 95 ○ OS2/Warp ○ Win NT ○ Mac ○ UNIX ○ DOS/Windows 3.11

STEP THREE: MULTIMEDIA UPGRADE ○ Please Add To Step 1 & 2 Quotation ○ Please Quote Me Separately

CD ROM DRIVE: ○ Internal ○ IDE ○ SCSI ○ External

CD ROM TITLES INCLUDED: ○ 1-5 ○ 5-10 ○ 11+

○ 8X ○ 10X ○ 12X ○ 16X ○ 20X

○ BRAND NAME ○ No Brand Name Preference

CD ROM Brand Name and Model Number

SOUND CARD: ○ 16Bit ○ 32Bit ○ 64Bit

SPEAKERS: ○ Less Than 25W ○ 25 to 50W ○ 50 to 75W ○ More Than 75W

STEP FOUR: NOTEBOOK SECTION - Please Note You Must Make Choices In Steps 1 & 2 To Complete Step 4

SCREEN TYPE: ○ 10" ○ 11' ○ 12' ○ Active Color ○ Dual Scan ○ 13'

PCMCIA SLOT: ○ Type II ○ Type III ○ Type IV

○ Audio Capable ○ Docking Station ○ Extra Battery ○ Fax Modem ○ CD\MultiMedia

STEP FIVE: NETWORKING NEEDS: ○ Please Contact Me on My Networking Needs Indicated Below
○ Software ○ Hardware ○ Consultation ○ Design ○ Installation ○ Administration ○ MS Workgroups
○ Users 2 to 10 ○ Users 10 to 50 ○ Users Over 50 ○ Lantastic ○ Apple Talk ○ Novell ○ MS NT

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STEP SIX: UPGRADES & PERIPHERALS: ○ Ink Jet Printer ○ Tape Backup ○ Accelerator ○ Digitizer
○ Laser Printer ○ Color Printer ○ Dot Matrix Printer ○ Flat Bed Scanner ○ Hand Scanner

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QUOTATION HOTLINE

Products Needed: The whole field of building inter-company integration tools is wide open. We need someone to do for small-business task forces what Lotus Notes has done for the very large corporation. Tools are needed that will automatically schedule online meetings, that will watch information services and act for the group if certain criteria are met, and that will distribute information among the members. If someone could guarantee privacy to users, they could make a fortune just helping small companies to integrate with each other temporarily. We need ways to create "courtyards" that can be shared among temporary alliance partners, while their private company data is behind impermeable firewalls. And we need all this to be both cheap and trustworthy.

Authentication And Payment

Problem: If you make a short-term alliance with a company far away, you need to be able to authenticate them. You need to know that they are really who they say they are. There are unsavory software companies proudly announcing they can forge the sender names on messages.

You also need to know that you will be paid.

Sample Solution: There is one cheap and simple way to get a great deal of privacy. You can broadcast information to your business-partners on a Web site whose name and URL change daily. If the only people who know the URL are people who should visit it, you have relatively private communications.

If you want to be a little more professional, visit the Web pages Netscape maintains to explain its security system. You can use a system of "certificates" with other users that will give you some assurance you are exchanging email with the person you think you are.

Certificates are issued by private companies, so you will only trust a certificate if you trust its issuer. Prices vary for a certificate, and so do the conditions to obtain one. But when you do obtain a certificate, you can send a copy of it to those with whom you wish to correspond securely. Thereafter, when they receive mail from you, their copy of Netscape Navigator will say, "Hey, this certificate is just like the one Joe sent you earlier."

It will also make possible encryption. The certificate they have sent you contains their "public key," a cryptographer's term for a special code. That code will allow your copy of Navigator to encrypt the message in a way only they can decrypt. While not absolutely foolproof, certificate-based encryption allows you to create a reasonably secure messaging system for your task-force or temporary federation of companies. It would take very powerful computers quite a while to crack encryption based on the certificates—but it could be done.

We need ways to create "courtyards" that can be shared among temporary alliance partners, while their private company data is behind impermeable firewalls. And we need all this to be both cheap and trustworthy.

If you want really secure communications, you can use the "secure-sockets layer." This is based on the same idea of encrypted communications, but is only used for communication with a Web site. First you communicate with the Web site; you and the site recognize each other by an exchange of certificates. Then your system and the Web site's system jointly create a one-time encryption scheme. They pass that back and forth to each other using the certificate-based encryption system. This private encryption scheme then becomes the one they use to exchange data. The encryption is thus two layers deep—first the encryption based on certificates; and secondly the one-time-only encryption created by the secure-sockets layer.

Products Needed: We need one standard for certificates. Presently there is a wide variety of types of certificates, as well as a wide variety of providers. There is one for Netscape, one for Internet Explorer, and a third for PGP encoding for mail. We need to have some kind of standardization for certificates, so users of all browsers can recognize them.

Payment between far-flung partners is potentially a major problem. We need someone who will accept payments in escrow, payable on confirmation that some task is completed. How we structure that remains an open question, but its existence will facilitate making agreements with people who are basically strangers.

Tell Me About Your Product...

If your company is making a product that will help small businesses to collaborate, drop me an electronic press release (*birrell@well.com*). Please—I am looking for SOHO products, not something for a large company. It needs to be cheap, comprehensible to an overworked user, and reliable. ■

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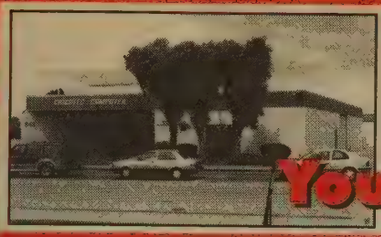
RESOURCES:

WebCompass, $49.95
Procomm Plus 32, $149
Quarterdeck
URL: *http://www.qdeck.com/qdeck/products*

Netscape's FAQ about security
URL: *http://home.netscape.com/assist/security/content.html*

Internet Certificate providers
URL: *https://certs.netscape.com/client.html*



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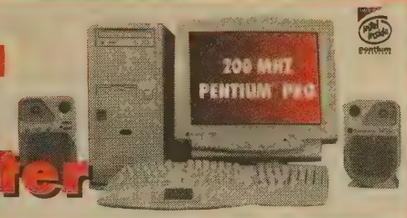

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- ESS 16 PNP Sound Card
- 60W Amplified Speakers
- 104 Key Keyboard
- Microsoft Ergonomic Mouse
- Mini Tower Case with Power Supply
- Microsoft Windows 95

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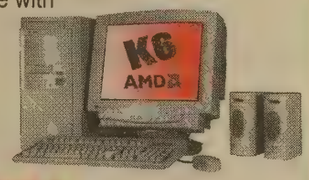

$778 Model K6P 200 CS

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- 1.44 MB TEAC Floppy Drive
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- EIDE & 16550 I/O
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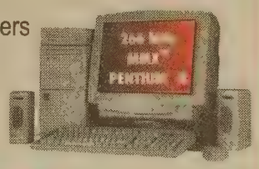
- 60W Amplified Speakers
- Microsoft Window 95
- 17" Impression 1280 x 1024 SVGA Monitor add $495



$1608 Model PII 266 CS

Pentium II - 233 $1464 Model PII 233 CS

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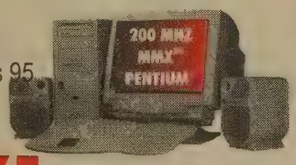
- Diamond Stealth 3D 3000 PCI 2 MB DRAM
- 1.44 MB Floppy Drive
- 20 X EIDE CD ROM
- Sound Blaster 16 PNP Sound Card
- 60W Amplified Speakers
- Maxi-Switch 104 Keyboard
- Microsoft Ergonomic Mouse
- Minitower Case with power Supply
- Microsoft Windows 95



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Pentium® 166 MMX **$786** Model PTM 166 CS

200 MHz PENTIUM® HOME MULTIMEDIA

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- 16 MB EDO 60 ns RAM
- 512K Pipeline Cache
- 1.2 GB EIDE Hard Drive
- Trident 9680 PCI 2MB DRAM SVGA Card
- 1.44 MB Floppy Drive
- 20 X EIDE CD ROM
- ESS 16 Bit PNP Sound Card
- 60W Amplified Speakers
- 104 Key Keyboard
- Microsoft Ergonomic Mouse
- Mini Towa Case with Power Supply
- Microsoft Windows 95

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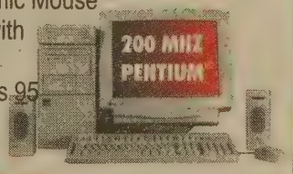

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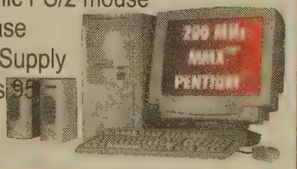

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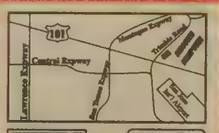

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BY DOUGLAS J. NAKAKIHARA

PalmPilot

Cool (And Useful, Too!)

Portable computing is something everyone seems to want these days. Many people opt for notebook computers, but their price-performance ratio is so poor, most people really have to need one to justify a purchase.

Personal digital assistants or PDAs have been quickly gaining popularity because of their size and features, but the good ones have also been a bit pricey. Moreover, PDAs are often islands unto themselves, with limited expansion and connectivity with PCs. Face it, many PDAs aren't much more than expensive toys, and can't honestly be categorized as a serious business tool.

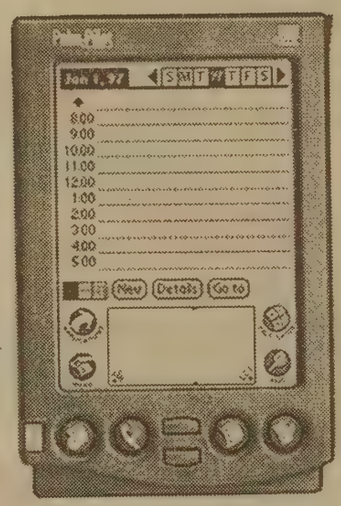
The 3Com (formerly US Robotics) PalmPilot is one of the true exceptions. This PDA, at 4.7" x 3.2" x .7"—barely larger than a deck of cards and slightly smaller than an HP-12C calculator—and weighing only 5.7 oz. with batteries, is a wonder to behold and use. It will easily fit in your shirt pocket or purse, and comes with all of the essential applications.

Basic Features

The application interfaces appear on the large 160 x 160 pixel back-lit LCD display. (The original version of the device did not have a back-lit display.) Depending on the app, you select menus, click buttons, and draw graphics right on the display, using a plastic writing stylus that's specially designed not to scratch the screen.

The stylus slides neatly and securely into a little slot on the PalmPilot. I like the fact that there are no electronics in the stylus and replacements are cheap, at about $2 apiece. They even send you a free one when you register.

Beneath the display is the input area. Here you enter text using a writing technique called Graffiti. The PalmPilot doesn't really use hand-



writing recognition per se. What it does is require you to form each letter, number, or symbol using a special writing stroke. This means there is no "training" involved to make the device recognize your writing style; however, you must use the correct writing strokes or you'll end up with the wrong text.

Fortunately, most of the strokes are close to the way you would normally write out text. For example, the stroke for the letter A is the top part of the letter, basically an upside-down letter V. Getting capital letters is simply a matter of entering a special "shift" stroke. This can be for just the next character or locked on as with Caps Lock on a keyboard. Special symbols (@, #, $, %, etc.) are entered by preceding the stroke with a special mode stroke.

This is not nearly as difficult as it may sound, and it won't be long before you can enter most of the alphabet without referring to a "cheat sheet." The PalmPilot comes with a set of Graffiti reference stickers you can adhere to it. You can also access an online Graffiti listing.

You can also use a graphical keyboard as an input device. This appears instantly when you touch a hot spot on the input area. Actually, I've found that you can enter text many times faster using this method; however, it reminds me of hunt-and-peck typing. (Do it in front of a fellow PalmPilot user and you'll likely get a sneer of "Graffiti-snobbery.") There are additional keyboard templates for numbers, special characters, and foreign letters and symbols.

Gates Was Right

To paraphrase Bill Gates a bit, maybe one-half meg of memory is enough after all, because that is all the Personal Edition of the PalmPilot includes. There is no hard storage, so everything is saved in RAM.

If this worries you a little, it shouldn't. Even with the batteries drained to the point your PalmPilot is not functioning, memory will be retained for about a month, one minute if you take the batteries out. (All data is also saved to your PC, but more on this later.)

After loading the system, you are left with 480K; however, don't let that fool you. It's plenty of space for all but the most demanding users—enough memory to hold 2,500 addresses, 2,400 appointments, 500 memos, and 500 to-do list items!

If it turns out not to be enough, you can upgrade to one meg for $129. Of course, if you know you'll need more, just get the Professional Edition ($369), which comes with 1MB. I should note that the 1MB upgrade gives you all of the functionality of the Professional Edition.

Applications

The PalmPilot ships with several full-featured apps, like a date book, address book, to-do list, memo pad, calculator, expense tracker, and some games. However, it doesn't stop there.

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PalmPilot *continued...*

This is where the fun begins. There are literally hundreds, if not thousands, of commercial, freeware, and shareware applications available. Plus, many PIMs are compatible with the PalmPilot, like MS Schedule+, Lotus Organizer, Symantec ACT!, Now Up-To-Date, Sidekick, ECCO, Day-Timer Organizer, Maximizer, and Franklin Ascend 97.

Check out *http://palmpilot.3com.com* for links to many unofficial PalmPilot sites, with tons of stuff to load onto your PalmPilot. An HP-12C emulator is a must-have, and there's a plethora of sketching programs for storing maps or just doodling.

Of course, games are plentiful, with most of the classic arcade and card games available. Even though the PalmPilot only supports four colors, it's surprising just how good some of the graphical applications are. It is also capable of emitting the standard sort of beeps and chirps, although I wish you could turn the darn thing up!

There is even an Internet mailing list which you can subscribe to at *www.pilotgear.com* . Every day, you'll get an email message, usually listing several new apps for your PalmPilot. If you're using something like Internet Explorer or Netscape, you can click right in the message to download the program.

To be honest, it won't be addresses and appointments that will fill your memory, it will be the other applications you load onto your PalmPilot.

It won't be addresses and appointments that will fill your Pilot's memory; it will be the other applications you load onto it.

Hot Sync

PC versions of the supplied applications are also provided. This allows you to run those applications on your PC just as if you were using your PalmPilot. Although you are using independent data files, it will not pose a problem because you can sync the data between your PC and PalmPilot with literally the push of a button.

The PalmPilot comes with a special cradle that connects to the serial port of your PC. Your PalmPilot slips into the cradle and all data is automatically synced when you press a button. Even if your application has no PC equivalent, the data is backed up to your PC! This is also how you load new applications onto your PalmPilot. You just run a little utility program on your PC that identifies the app, which is downloaded to your PalmPilot the next time you perform a hot sync.

The PalmPilot can synchronize data with Macs; however, PC desktop-dependent PalmPilot functionality, like (hot sync) email

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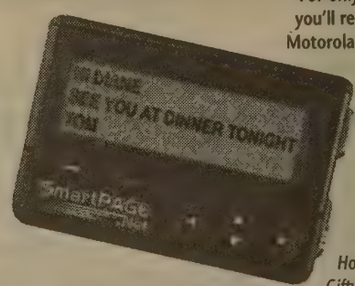

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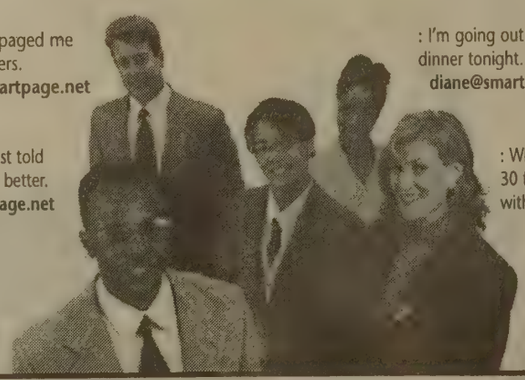

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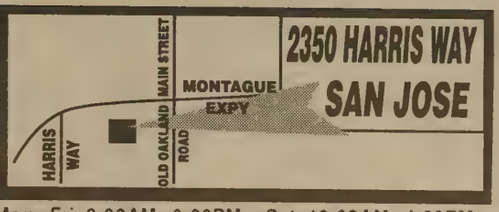

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and expense-tracking application, is not available to Mac users. Mac users will also need the PalmPilot MacPac ($14.95), which includes an adapter so your cradle can be connected to a Macintosh modem or printer port.

Connectivity

With 1MB of memory you can add email connectivity and TCP/IP capabilities, which will enable you to run optional network applications. This allows you to access information over a network. A network version of the Pilot's synchronization utility ($69) lets you synchronize data (email and PIM information) over a LAN or via a dial-up connection to your desktop PC; you can remotely reply to and send new messages right from your PalmPilot.

The coolest way to use the PalmPilot for email is to either connect it directly to a modem using a special cable ($20) or get the modem add-on ($129). Available third-party software will let you define POP and SMTP settings, making your PalmPilot a truly portable email device. All of the applications I looked at (some were even freeware) gave you the option of leaving messages on your mail server, so you can still access them later on your PC. If not for this, large messages, like those with file attachments (useless on your PalmPilot), would be lost once your PalmPilot downloaded a truncated version. Some applications allowed you to set up filters, which might be nice for skipping voluminous non-essential mail sources, like mailing lists.

The PalmPilot modem adapter snaps onto the bottom and extends the length a mere two inches. It's only a 14.4Kbps modem, but that's plenty of horsepower considering you likely won't be accessing the Web nor downloading huge email messages. (Note: A text-only Web browser is available!) It sports a standard RJ11 phone jack and comes with a 10' cable. The device is powered by two AAA batteries (included) for up to five hours of continuous use, with an optional AC adapter ($20) available as well. An audible low-battery warning signal is also featured.

PalmPilot Email Software

The PalmPilot Professional comes with its own email software that will work with any VIM or MAPI standard compliant email program, including Lotus cc:Mail (versions 2.5, 6.0, and 7.0), Microsoft Outlook, Microsoft Exchange 4.0, Windows Messaging 4.0, Microsoft Mail 3.5, and Windows for Workgroups Mail.

However, the software is not really a true Internet email application. What it does is utilize your existing mail application to read and send email after you perform a hot sync.

The bad news about using this software is that it always removes the messages from the mail server. To avoid this situation, there is an option that will only send email, not retrieve. Of course, if you were already at your PC, you'd just use your PC mail application to read your email anyway.

3Com did everything right with the PalmPilot. It can quickly become as indispensable as your wristwatch. In fact, it can replace your watch. Sure, it's a lot bulkier, but can your watch do email?

There certainly are times when you might create a message (offline) on your PalmPilot and then send it once you return to your desk. But, you really wouldn't need to use a email-capable PalmPilot to do this. You could just enter the message in the PalmPilot notepad and do a copy-paste into your PC mail compose application.

To sum it up, use your PC for email when you are at your desk. For way-cool remote email capabilities, use your PalmPilot with a modem. If you don't have a modem and are away from your PC, use your PalmPilot to compose your message.

Juice

The PalmPilot uses two standard AAA batteries. (That's right, no special batteries—not even hard-to-find watch batteries.) This is supposed to be enough juice to last you two to three months; however, your mileage may vary. For example, if you make heavy use of the backlight, battery drain will increase. I'm using rechargeable NiCads and changing batteries every few weeks with heavy use.

Accessorize

Although it comes with a nice leather case, with a reinforced side to protect the LCD screen, you might want to buy the optional belt clip case ($25). For those into fashion, there is even a leather Dooney and Burke case ($50) and Cross writing stylus (from $30).

If you really want to go all out, a special leather jacket ($239) is available with a special inside pocket for your PalmPilot!

Although 3Com's Web page provides a sleek way to order accessories, search the Net for places that discount PalmPilot accessories. You might be able to save some serious dough!

Palm Computing recently announced that paging capabilities will be available to PalmPilot users with a 2MB memory card add-on. Developed by Motorola Inc., the card will provide one-way paging without any size increase. The street price is expected to be under $200. With Motorola's recent announcement of a two-way paging device, it would seem like a natural to also bring this capability to the PalmPilot.

Apparently, application development is pretty easy for the PalmPilot, as demonstrated by the oceans of available PD-type software. (There are reportedly over 3,000 developers currently.) I'd expect to start seeing companies selling single-purpose PalmPilots—perhaps utilizing most of the memory for specialized applications like in the medical field.

Buy One Now

3Com did everything right with the PalmPilot. It can quickly become as indispensable as your wristwatch. In fact, it can replace your watch. Sure, it's a lot bulkier, but can your watch do email?

So if you've been waiting for the perfect PDA, it's here, and it's reasonably priced. Happy piloting everyone. ■

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RESOURCES:

PalmPilot

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URL: *http://palmpilot.3com.com/palm/*

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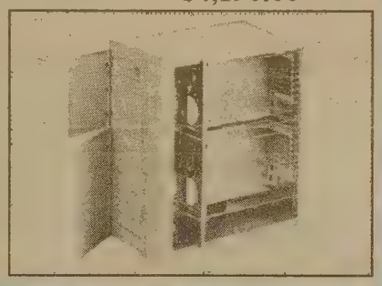

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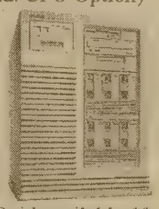

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ST19171WD/WC	9.1GB	7200RPM	8ms	$1050/950
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Fujitsu(UN/UW)

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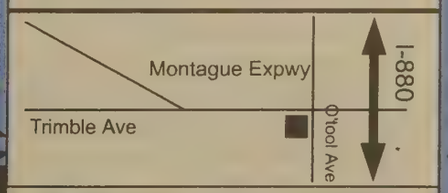

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32-Bit Computing

Series Groundrules: A Short Discussion Of Methodology

Last month I discussed the forthcoming 100MHz bus systems. While waiting for them to become available, let me introduce you to the methodology I will employ to evaluate them, as well as to the current best-of-breed 66MHz reference system. (I am seeing references to Intel's next-generation Pentium, the "Deschutes," as still supporting only the 66MHz bus!)

Operating System

For the standalone PC user, there aren't that many pure 32-bit options.

I was involved with OS/2 for a considerable time and, while it's hardly without problems, in some aspects it was better than Windows. I was still writing an OS/2 column here when many who faulted me for my criticism of IBM's handling of its OS had long migrated (quietly!) to Windows. But when IBM—validating my criticism—started promoting itself as the best Windows NT vendor, it was time to move on.

The user interface, hardware support and applications are continuously improving in the Linux environment, but they are nowhere near what PC users are used to, and usually get, under Windows. The several flavors of Linux are still more UNIX- than PC-oriented.

Apple's Rhapsody, while interesting, is still in development and an uncertain proposition, particularly on the Intel platform.

These OSes will be monitored for this series, but whether we like it or not, Windows NT Workstation is, at least for now, basically it (some benchmarks are available only for NT, see below). As Windows 95 acquires more 32-bit capabilities and NT gets more of the Windows 95 user interface and plug 'n' play support, they will probably converge; it is unlikely that Microsoft, given its controlling market position, will continue to maintain, upgrade and support two separate versions. In fact, there have already been warnings about Windows 98 being the last upgrade. As corporations migrate to NT, they will force both small/home businesses and individuals into it, the latter, if nothing else, to use the same software at work and home.

Performance Measurement

Benchmarking/interpreting results is the trickiest of businesses. An extremely demanding proposition, no matter how good the job is, it always leaves somebody unhappy, or angry— it's the nature of the beast. I refer the reader to URL: *http://www/intel.com/procs/perf/limits.html* for a succinct explanation of benchmark types and the limits of their usefulness.

There is limited evidence that in certain narrow, specific circumstances, NT performs better than Windows 95. Be that as it may, its high hardware resource and support demands are NOT FOR EVERY PC USER.

There is limited evidence that in certain narrow, specific circumstances, NT performs better than Windows 95 (much to the surprise of many, including myself, even in some Microsoft quarters!). Be that as it may, its high hardware resource and support demands are not for every PC user. Yet for those who need, or want, a 32-bit operating system with a wide choice of applications and hardware support, it's the best they can do. Hopefully, Microsoft will take their needs to heart as it continues to develop NT Workstation.

I've looked into the various benchmarking software available and I opted for the recently released 98 versions of the commonly used/referenced Winstone and WinBench by Ziff-Davis Benchmark Operations (ZDBOp).

Winstone 98 is an application-based benchmark suite that measures the performance of whole PC systems. WinBench is a set of playback and synthetic test suites measuring the performance of the CPU, graphics, disk and CD-ROM subsystems. They and their results are described in the Sidebar.

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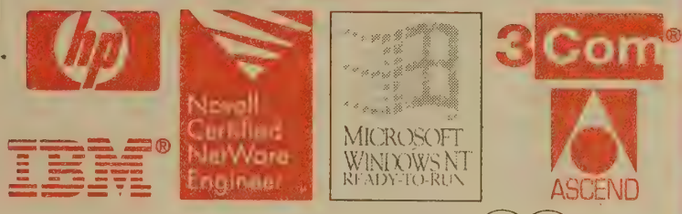

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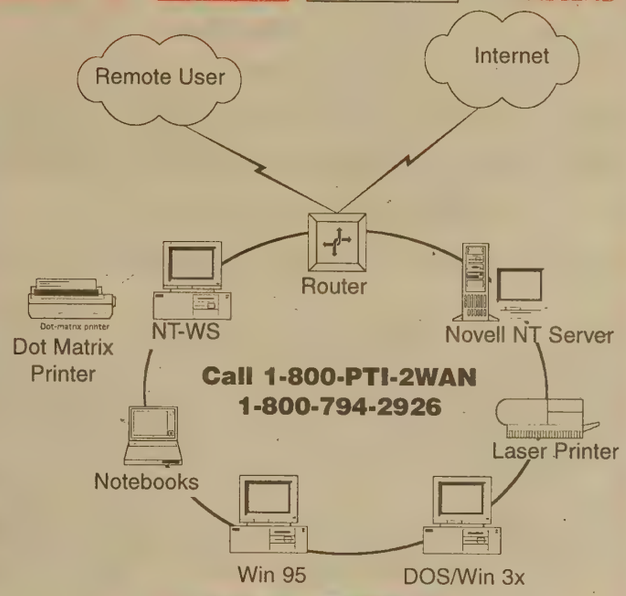

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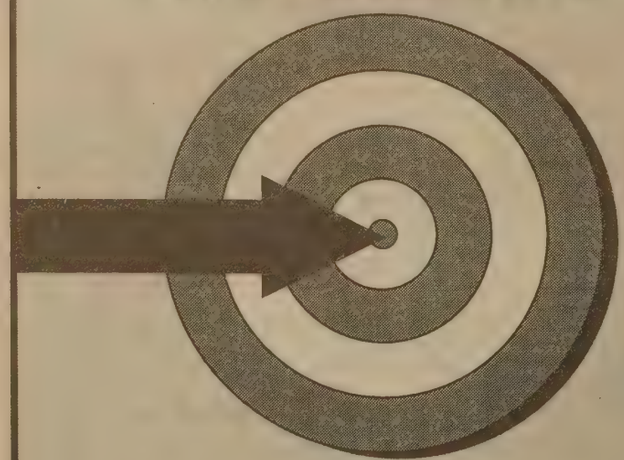

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Sidebar: The Ziff-Davis Benchmarks

Ziff-Davis Winstone 98 and WinBench 98 benchmark suites use the time a system requires to complete specific sets of operations to produce performance scores relative to a specific base system [1]. The higher the score, the better the performance.

Winstone 98 is an application-based benchmark suite. It runs leading Windows applications through a series of scripted common activities and produces a weighted performance score for a whole system from the individual application scores, using their market-shares as weights. The benchmark has two versions, Business and High-End, the former using common business applications (such as spreadsheet, word processing and database [2]), the latter specialized for more demanding applications (such as CAD and image editing [3]) under Windows NT only. The overall score is scaled to the base system's overall score, 10.0, for both levels.

WinBench 98 is a set of two playback and two synthetic test suites, each producing performance scores for the processor, graphics, disk and CD-ROM subsystems. In playback tests, the hardware calls made by the applications to a subsystem while executing the Winstone scripts were logged and are played back. The Graphics and Disk WinMarks are playback test suites and, like Winstone, have Business and High-End versions.

Graphics WinMark 98 (playback): Measures the performance of the graphics' subsystem in executing the graphics operations of the Winstone 98 application scripts. The overall relative scores for both the Business and High-End versions are compiled using the same method as in Winstone.

Disk WinMark 98 (playback): Measures the performance of the disk subsystem in executing the disk operations of the Winstone 98 application scripts. It has Business and High-End versions. The overall result, in KB/sec, reflects disk subsystem throughput.

In the synthetic tests, application activities in a subsystem were profiled and a statistical approximation of the operations on the subsystem is run. CPUMark32 and CD-ROM WinMark are synthetic tests.

CPUMark32 (synthetic): Measures the processor's subsystem 32-bit performance by running a workload simulating the CPU's behavior of leading (not Winstone) Windows applications. The mix includes data compression, date adjustment, word analysis, text formatting and so on. The relative score produced is a normalized, unitless number meaningful only for comparison to other WinBench 98 CPUMark32 scores.

CD-ROM WinMark 98 (synthetic): Measures the performance of the CD-ROM subsystem by playing back, as one test, a mix of operations in six sections, one for each profiled (not Winstone) application [4]. The overall result, in KB/sec, reflects CD-ROM subsystem throughput.

Notes:

[1] Dell/Dimension P5-133: 66Mhz bus, Pentium 133MHz, 256KB L2 Pipeline Burst cache, 32MB RAM; Matrox/Millenium PCI graphics adapter 4MB WRAM, driver v3.12, monitor settings: 1024 x 768 x 65k x 75Hz; primary IDE disk controller, Quantum/Fireball 1080A IDE drive.

[2] Microsoft Access 97, Excel 97, Word 97, PowerPoint 97; Lotus 1-2-3 97; Corel Quattro Pro 7, WordPerfect 7, DRAW! 7; Netscape Navigator 3.1.

[3] MicroStation 95; Adobe: PhotoShop 4.01, Premiere; AVS/Express 3.1; PV-Wave 6.1; Microsoft FrontPage 97, Visual C++ 5.0.

[4] Corel GALLERY 2; Quicken for Windows CD-ROM DeLuxe; *Disney's Animated StoryBook—The Lion King; Myst; Compton's Interactive Encyclopedia*; Microsoft Encarta 95.

continued on page 82

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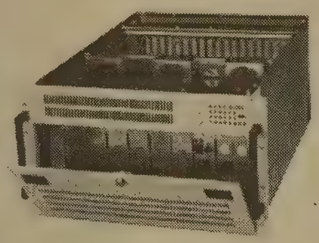

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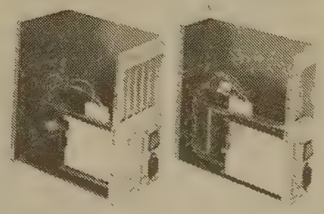

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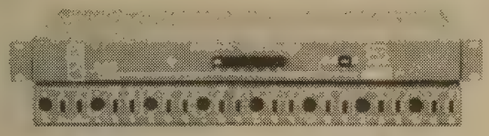

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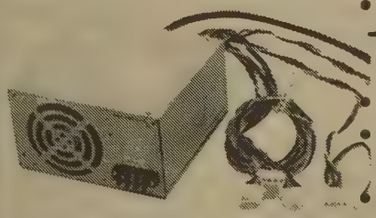

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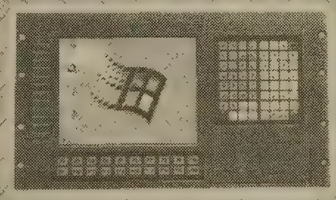

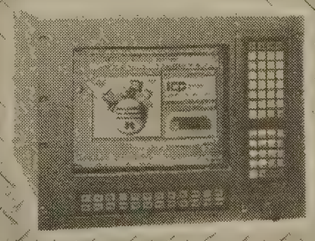

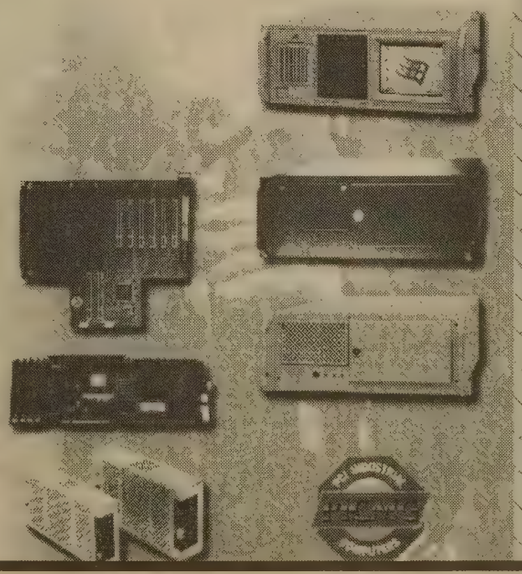

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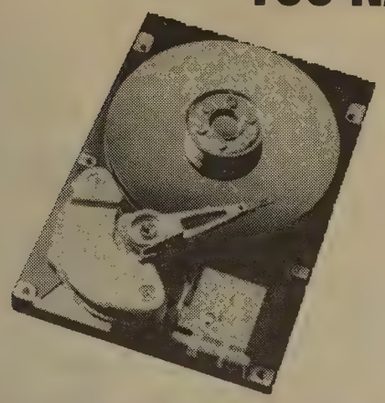

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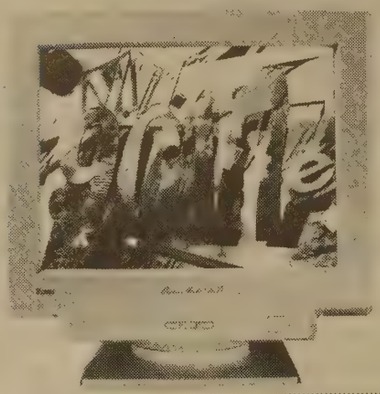

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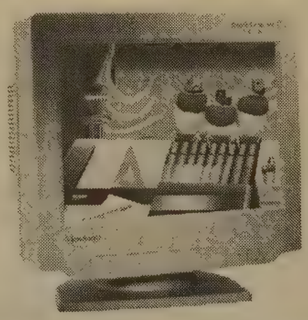

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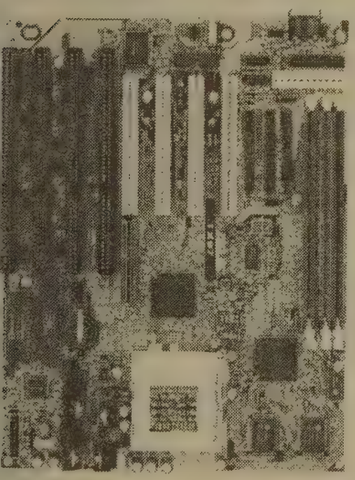

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32-Bit Computing *continued from page 76*

I will also use other benchmarks, specialized in specific subsystems, such as CDTach for the CD-ROM subsystem and ThreadMark for the disk subsystem. It is very important to keep in mind the following points when interpreting benchmark results:

• Results are not absolute, but relative to some specific base system. Thus, a Winstone score of 10.3 does not, per se, tell you anything about a system's performance; it only acquires meaning relative to the ZDBOp's base system's score of 10—it means 3% better performance. Furthermore, the scores of any two systems can be used to compare their performance, by virtue of both being relative to the same base system.

• Subsystem comparisons are meaningful only in the context of ABE —"all else being equal." The performance effects of two disk drives on a disk subsystem can only be compared by switching the drives, but keeping everything else the same (and I do mean everything: hardware, software, settings, configurations—down to active applications and disk fragmentation).

Listing 1: Best-of-Breed Slot 1 System

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Memory	Unigen/SDRAM 64MB/128MB	
Speed	10ns/66MHz	
GRAPHICS SUBSYSTEM		
Controller	Diamond/FireGL 1000 Pro	
Monitor	Eizo-Nanao/FlexScan FX-E8	
DISK SUBSYSTEM		
Controller	Adaptec/AHA2940UW	
HDrive	IBM/UltraStar 9ZX 9.1GB	Quantum/Viking II 9.1GB
Rmv Drv	SyQuest/SyJet 1.5GB [1]	Imation/LS-120 [2]
Cables	Granite/SCSIVue Gold	
Int	Teflon Ribbon	
Ext	Gold Diagnostic	
CD-ROM SUBSYSTEM		
Drive	Plextor/UltraPlex 32X	

[1] SCSI
[2] IDE

Best-Of-Breed Components

Via research into and monitoring of technologies, products and other reputable evaluations, best-of-breed hardware components (more than one candidate in each category, where possible) will be identified. Units obtainable from vendors will be assembled into working systems, reviewed and benchmarked.

Also reviewed will be components which, while not part of the subsystems, are necessary for a full working system, such as the case and system integration services.

When the dust settles in the currently fluid Internet fast access technology, communication components will also be added (currently, the most cost-effective option seems to be cable modems, but it is only experimentally and very sparsely deployed). All-in-one (print/ scan/copy) peripherals will be covered as USB versions become available. Protection and performance-enhancing devices will also be considered. There will also be reviews and recommendations of essential and stand-out software.

Based on evaluation results, recommendations will be made. Every article in the series will specified the current recommended set of components—the "best of breed system," so to speak. The configuration will be revised whenever one or more components are upgraded, or "better" alternatives/technologies become available and/or affordable. For example, a LCD panel may replace the bulky monitor.

Other OSes will be monitored for this series, but whether we like it or not, Windows NT Workstation is, at least for now, basically it.

Listing 1 references the initial set of components currently being assembled for evaluation—a Slot 1/Pentium II system. It is based on a 66MHz bus system board—the current standard against which the performance gains from forthcoming 100MHz systems will be assessed.

Note that the 512KB L2 cache built into the Pentium II CPUs runs at half the processor speed and, therefore, it is not tied to the bus speed like its counterpart carried by Socket 7 system boards (which can be larger than 512KB too!). Therefore, the effect of a faster bus speed will not be as pronounced as for Slot 1 systems. Furthermore, the currently available SDRAM clocks at 66MHz, which would introduce one wait-state for faster buses. In fact, it may even balk at a 75MHz bus altogether, as may adapters at the ensuing higher PCI bus speeds (also tied to the bus speed). Consequently, even if the board allows it, the performance gains may not be sufficient to justify the risk of operating at officially unsupported rates. ■

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RESOURCES:

Winstone 98
WinBench 98
Ziff-Davis Benchmark
Operation (ZDBOp)
URL: *http://www1.zdnet.com/zdbop/zdbop.html*

ThreadMark
Adaptec Inc.
URL: *http://www.adaptec.com/products/overview/threadmark.html*

CDTach
TestaCD Labs
URL: *http://www.tcdlabs.simplenet.com/*

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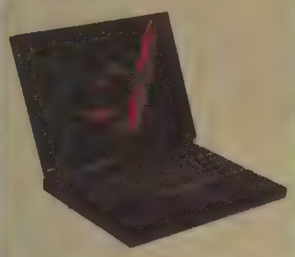

IBM

Model	Processor	Ram	HD	Screen	Price
ThinkPad 380	PENT-™/150	16MB	1.08GB	12.1 DUAL SCAN	$1634.
ThinkPad 380D	PENT-™/150	16MB	1.35GB+8X	12.1 DUAL SCAN	$1904.
ThinkPad 560	Pent-133	8MB	2.1GB	11.3 DUAL SCAN	$1632.
ThinkPad 560	MMX/150	16MB	2.1GB	DUAL SCAN	$2502.
ThinkPad 560	Pent-133	8MB	2.1GB	12.1 ACTIVE	$2720.
ThinkPad 560	MMX/166	16MB	2.1GB	12.1 ACTIVE	$3895.
ThinkPad 760XD	MMX/166	32MB	3.0GB+8X	12.1 ACTIVE	$4216.
ThinkPad 760XI	MMX/166	16MB	2.1GB	12.1 ACTIVE	$3423.
ThinkPad 760XL	MMX/166	32MB	2.1GB	12.1 ACTIVE	$3754.
ThinkPad 765D	MMX/166	32MB	3.0GB+8X	13.3 ACTIVE	$5240.
ThinkPad 765L	MMX/233	32MB	3.0GB	13.3 ACTIVE	$4897.
ThinkPad 770	MMX/233	32MB	4.0GB	13.3 ACTIVE	CALL
ThinkPad 770	MMX/233	32MB	4.0GB	13.3 ACTIVE	CALL
ThinkPad 770	MMX/233	32MB		13.3 ACTIVE	CALL
ThinkPad 770	MMX/233	32MB	3.2GB	13.3 ACTIVE	CALL

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TECRA 740CDT $8???

TECRA 530CDT $3???

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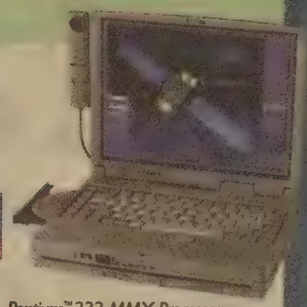

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400CDS	Pentium™/75	8MB	500MB+4X	10.4" Dual Scan	$1098.
430CDT	Pentium™/120	16MB	1.2GB+10X	11.3" Active Clr.	$1998.
440CDX	P133-MMX	16MB	1.34GB+10X	12.1" Fast Scan	$2898.
440CDT	P133-MMX	16MB	1.34GB+10X	12.1" Active Clr.	$2658.
460CDT	P166-MMX	32MB	2.02GB+10X	12.1" Active Clr.	$3598.
3600CT*	486 DX2-50	8MB	250MB	8.4" Active Clr.	$998.
3600CT*	486 DX2-50	8MB	500MB	8.4" Active Clr.	$998.
650CT	Pentium™/133	16MB	1.2GB	11.3" Active Clr.	$2998.
660CDT	Pentium™/150	16MB	1.35GB+10X	11.3" Active Clr.	$3198.
300CT	P133-MMX	32MB	1.51GB	10.4" Active Clr.	$3348.
510CDT	Pentium™/133	16MB	2.1GB+10X	12.1" Active Clr.	$2648.
520CDT	P166-MMX	32MB	2.02GB+10X	12.1" Active Clr.	$4178.
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740CDT	P166-MMX	16MB	2.1GB+10X	13.3" Active Clr.	$4698.
750CDT	P233-MMX	32MB	4.77MB+20X	13.3" Active Clr.	$6446.

*SubNotebook

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7340	Pentium™/133MMX	32MB	1.4GB+10X	12.1" Active Clr.	$2010.
7360	Pentium™/166MMX	32MB	2.2GB+10X	12.1" Active Clr.	$2978.
7560	Pentium™/166MMX	32MB	3.2GB+10X	13.3" Active Clr.	$3967.
7580	Pentium™/233	32MB	3.2GB+20X	13.3" Active Clr.	$4952.

Hitachi Notebooks

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1530DM	Pent-™/133	16MB	1.4GB+10X	12.1" Dual Scan	$1868.
4131T	Pent-™/133	16MB	1.4GB	12.1" Active Clr	$1898.
4150	Pent-™/150MMX	16MB	1.6GB	12.1" Dual Scan	$2088.
4160T	Pent-™/166MMX	16MB	2.0GB	12.1" Dual Scan	$3178.
4160TSL	Pent-™/166MMX	16MB	2.0GB	12.1" Active Clr	$3368.
7330T	Pent-™/150MMX	16MB	2.1GB	12.1" Active Clr	$3088.
7350MT	Pent-™/166MMX	32MB	2.1GB	12.1" Active Clr	$3548.
7710MT	Pent-™/150MMX	16MB	1.6GB	12.1" Active Clr	$2618.
7730MT	Pent-™/166MMX	32MB	2.1GB	12.1" Active Clr	$4108.
7750MT	Pent-™/166MMX	32MB	3.0GB	12.1" Active Clr	$4671.
LTE5400	Pent-™/150	32MB	2.16GB	12.1" Active Clr	$3048.

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DP-2000	Pent-™/166MMX	16MB	3.2GB	Windows 95	$1058.
DP-2000	Pent-™/200MMX	16MB	2.1GB	Windows 95	$1118.
DP-2000	Pent-™/200MMX	32MB	3.2GB	Windows 95	$1268.
DP-2000	Pent-™/233MMX	32MB	3.2GB+16X	Windows 95	$1628.
DP-2000	PPro-200	16MB	2.5GB+8X	Windows NT 4.0	$1898.
DP-2000	Pent-™/166MMX	32MB	3.2GB+16X	Windows 95	$1358.
DP-2000	Pent-™/200MMX	32MB	3.2GB+16X	Windows 95	$1468.
DP-2000	PPro-200	32MB	2.5GB+8X	Windows NT 4.0	$1998.

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VL5	MMX/166	16MB	2.5GB+24X	W-95 / WFW	$957.
VL5	MMX/166	32MB	2.5GB	W-NT 4.0	$1127.
VL5	MMX/200	16MB	2.5GB	W-95 / WFW	$1034.
VL5	MMX/200	32MB	2.5GB	W-95 / WFW	$1204.
VL5	MMX/233	32MB	2.5GB	W-95 / WFW	$1339.
VL5	MMX/200	32MB	2.5GB+24X	W-95 / WFW	$1254.
VL5	MMX/233	32MB	2.5GB	W-95 / WFW	$1254.
VL6	Pent-II/233	32MB	2.5GB	W-NT 4.0	$1551.
VL6	Pent-II/233	32MB	2.5GB	W-95	$1449.
VL6	Pent-II/266	32MB	2.5GB	W-NT 4.0	$1797.
VL6	Pent-II/266	32MB	2.5GB	W-95	$1695.
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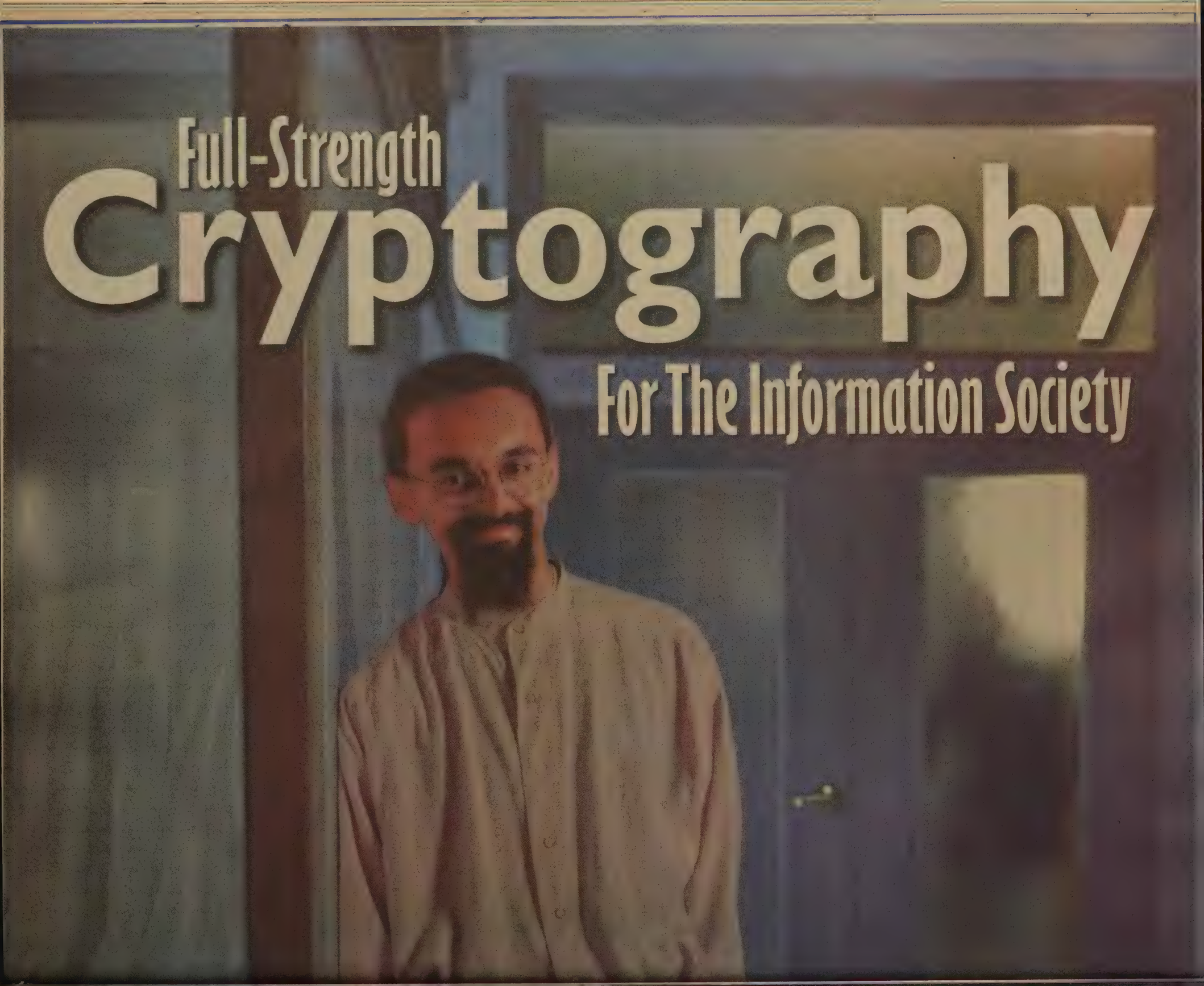
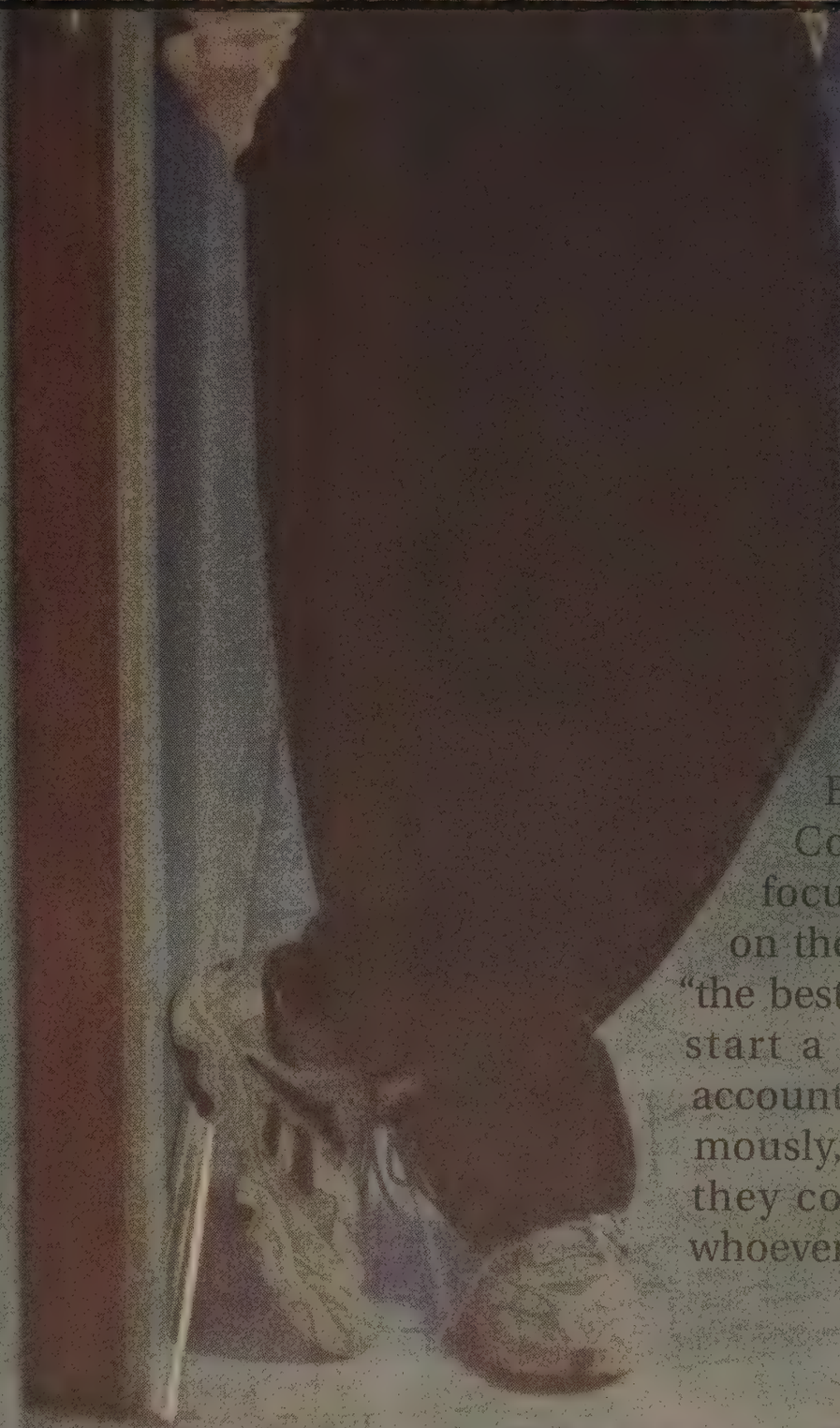




"The decisions we make about communication security today will determine the kind of society we live in tomorrow."

Whitfield Diffie

"Today, the current Internet issue is cryptography and making sure people have the tools to protect themselves, as opposed to relying on the government to catch criminals."

Sameer Parekh
C2Net, President

In 1994 while attending UC Berkeley, Sameer Parekh started Community ConneXion, an ISP focused on protecting people's privacy on the Internet. At that time, he believed "the best way to deploy cryptography was to start a service where people could get accounts anonymously, send email anonymously, setup Web pages anonymously so they could protect their privacy against whoever might want to invade their privacy."

By Michael Robin • Photos By Tustin Ellison

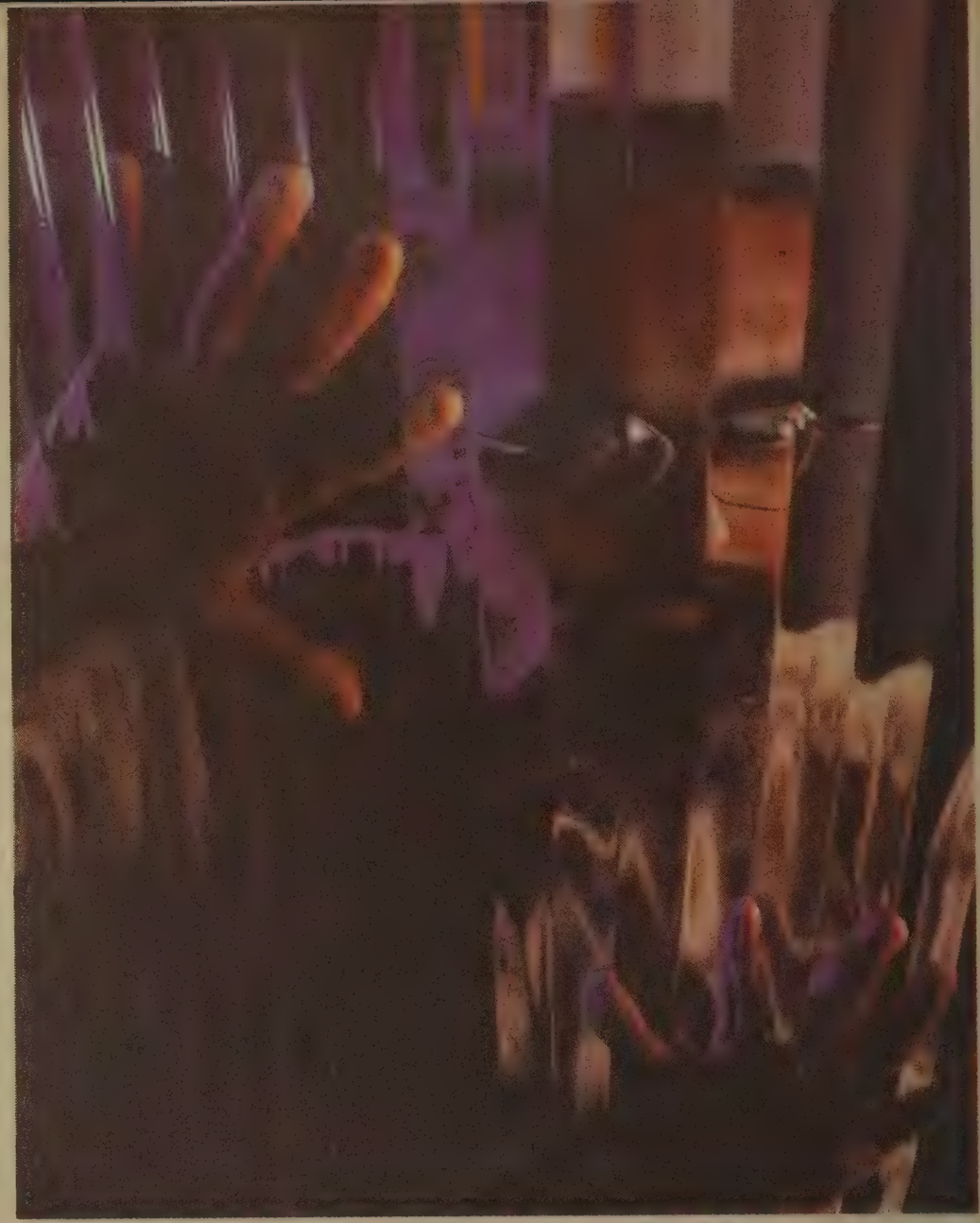
During late 1995-early 1996, Parekh was developing Internet security software to enhance Community ConneXion's Web servers. But, like almost everything else in the quickly evolving world online, his vision of the "best way to deploy cryptography" was also changed. He now believed that, rather than selling services, selling software was a more effective way to implement cryptography and privacy technology. By the end of 1996, he had sold off the ISP business, renamed the company to C2Net (*http://www.c2.net*), opened an office in downtown Oakland, and started hiring people and developing more software. This move placed Parekh in the middle of one of the most contentious fights surrounding technology today—the role of cryptography in a democracy.

In an age of digital information, the protection of information—digital communications and stored data—becomes increasingly critical. Cryptography, the art of secret writing, is a powerful tool for protecting information. In practice, this means first the transformation of information into some unreadable form, a process known as encryption, and then the ability for authorized individuals to return this encrypted information into a readable form, a process known as decryption.

Today's hotly contested public debate on cryptography is often presented as black and white; a fight between good and evil, with each side presenting its own characterization of what is good and what is evil. On one side are those who argue for strong crypto to protect the privacy of individuals and businesses. On the other are those who claim the need to limit the spread of strong crypto for law enforcement and national security.

While each picture does have its kernels of truth, real life is rarely black and white. The technology that law enforcement argues may hinder, if not cripple, their fight against criminals, terrorists, and others, is the same technology that secures sensitive communications from attacks by these same groups. So, while cryptography may be used by a small group of criminals or industrial spies, it can also ensure the security of cell phone conversations, surfing the Web from home, government records, and global financial transactions.

Further complicating the black and white dichotomy of cryptography is that cryptography and its related technologies do more than just assure the confidentiality of information. Cryptography provides tools, embodied in applications such as digital signatures and certificates, to verify the authenticity of the people communicating electronically and to ensure the integrity of digital documents. Without reliable methods for knowing who you are talking with or confirming that a particular document is both the original and unaltered, much of the promise of digital communications will never be realized.



I started doing some research and learned that cryptography is a very valuable tool for protecting people, organizations, and companies from both government and criminal abuse of freedom and privacy.

Along with the explosive growth of the Internet in the 1990s, the things cryptography enables us to do also continue to grow. Unfortunately, current US policy restricts the discussion of cryptography on the Internet and the sale of strong encryption products on the world market. Since most US companies find it prohibitively expensive to develop two versions of the same product—one with strong encryption for domestic use only, and another with weakened encryption for export—the level of security they offer everyone is effectively weakened. Keeping strong crypto out of the market further slows the development and implementation of new applications that require higher levels of security.

In response to US regulations, C2Net is perhaps the first US company to relocate all of its software development off-shore, permitting it to sell single versions of its products with full-strength security software worldwide. With

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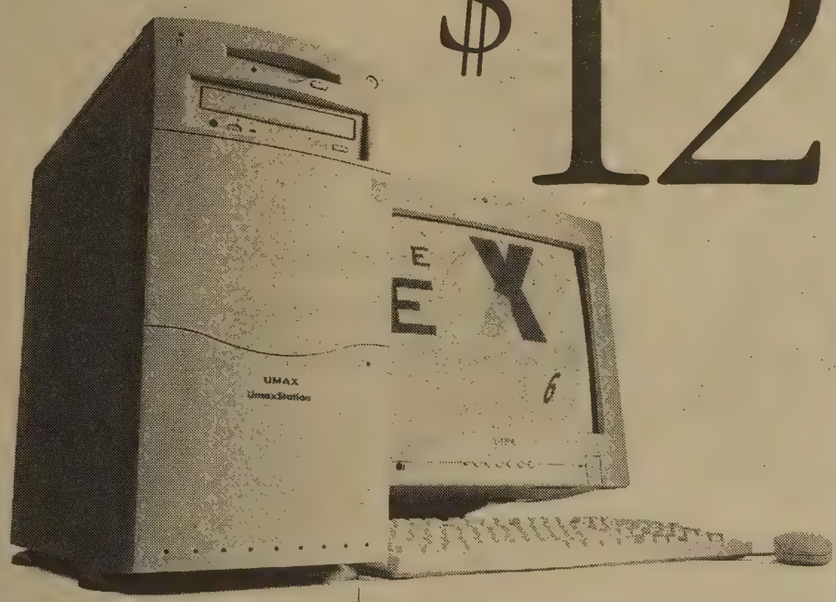

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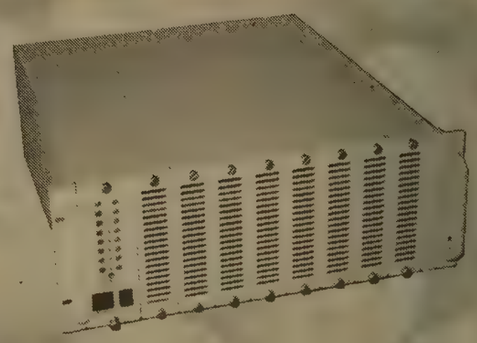

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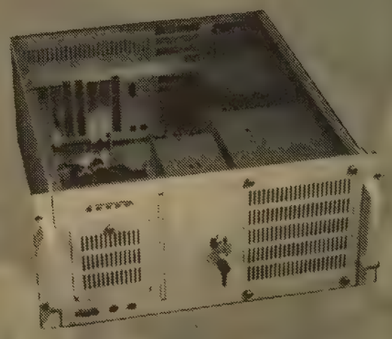

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offices for software development in the UK and Australia, C2Net also has a subsidiary in Anguilla, the British West Indies, to register intellectual property and manage its overseas operations.

I recently met with C2Net President Sameer Parekh at his Oakland office to discuss how he became involved in cryptography, moving C2Net's software development off-shore, and his perspective on some of today's issues surrounding the debate on cryptography.

* * * * *

How did you get involved in cryptography? Was there something in particular that drew your attention?

I first started getting involved in Internet privacy and civil liberty issues when the Secret Service raided Steve Jackson Games in Austin, TX, in '90. I learned about what was happening under Operation Sun Devil and realized all the things the government was doing that compromised individuals' civil liberties.

I started doing some research and learned that cryptography is a very valuable tool for protecting people, organizations, and companies from both government and criminal abuse of freedom and privacy.

Where were you at that time?

I was in high school, in the suburbs of Chicago. But I was on the Net and used various BBSes. They had raided a BBS in Chicago that I was regularly using as well.

In the wake of the Steve Jackson Games raid in Austin, the EFF (Electronic Frontier Foundation) was founded. In the beginning, the EFF itself was primarily concentrating on law enforcement's confusion. But now, law enforcement is reasonably good at understanding the Net. I wouldn't say that for high-level FBI, but if you are down at the level of people who do the real work, they are reasonably well-aware of what is going on.

Today, the current Internet issue is cryptography and making sure people have the tools to protect themselves, as opposed to relying on the government to catch criminals.

What do you mean by using "cryptography to protect ourselves from criminals"?

On the Internet today, since cryptography is hardly used, any organized crime outfit or terrorist organization can rather easily break into banking systems and steal money from people's accounts. A more sophisticated terrorist could, for example, decide to shut down the world's trading networks in order to cause severe damage to the world economy. This is possible because we're not using strong cryptography widely.

This may sound somewhat basic, but many people, especially those not on the Net, don't see what all the fuss is about. What is crypto and to whom does it matter?

Crypto is basically the ability to make electronic communications more real; if it's authenticated, it is signed with someone's signature that you can say, "it is from that person." If it's confirmed that it hasn't been modified in transit you can look at it and see that there is no white-out on it.

I don't think that the everyday guy on the street really needs to care about the cryptography. The people who need to care are the businesses that they work with. Say you have a guy on the street and he loses his credit card. He is out $50. But VISA or the merchant or the bank are the ones who take the liability. I think that when companies realize that there is this huge risk they are opening themselves to, they are going to force their customers to talk to them in a secure manner.

Once consumers are forced to use this technology to communicate with companies, because the companies need to protect their own interest, then people will see the value of the technology for communicating with each other. When they are sending email to their Moms, they can say, "I don't want my neighbor to see this, even though it is just about last Thanksgiving."

What would a functional crypto system look like and how would someone use it?

I am just coming up with this off the top of my head so, I might make a few mistakes.

Suppose you wanted to open an account with a bank. You would go into the bank branch, because according to all the laws they have now, they want to see you in person and to sign all the documents. The bank would give you a floppy disk with some software on it. You would stick it in your PC and install Netscape to connect to their Web site. You connect over an encrypted link, enter your account number and other secret information that they gave you when you met in person. Your browser would then generate a private/public key pair to identify yourself and send in a request to the server with the public key saying, "Please sign this public key." The bank's server would send back a signed version of that public key. Now that you've got this signed copy of the public key on your PC, in the future, whenever your PC talks to the bank it will automatically give the bank the signed public key. When your PC and the bank perform this operation, the bank knows that you own the private key associated with that public key and will give you access to do whatever you want with your bank account.

In that case you won't need to remember a password. The risk is that someone will break into your PC and use the information on your PC to connect to your bank account. But if someone broke into your house they could just go through your filing cabinet and get the same sensitive information.

But if your computer is connected to the Net via a cable modem or ISDN, giving you a pretty live connection, your computer is less secure than your file cabinet.

Yes, the computer itself is less secure in that situation. But there are other ways around that problem. For example, there is smart card technology where you can have a card which has the key on it. Your computer may be insecure, but the computer isn't storing sensitive information. The sensitive information is stored on a card that you keep in your wallet. Whenever you sit down at your computer you can take the card out of your wallet, stick it in your computer, and the card is doing the authentication. You can even stick the card in a friend's PC, accessing your bank account from your friend's house. As long as you keep physical control of that card your friend will not have access to your bank account—even if he was watching every keystroke you typed or was storing every bit that came out of the smart card, he still does not have the ability to access your bank account.

Storing private information on a PC is certainly not the thing that people should be doing, but in the short term, that is what people are going to do until smart card technology is deployed. Once smart card technology is deployed, it will be just like sticking your ATM card in the ATM machine, except it will be more secure because the ATMs don't use strong authentication technology.

Stronghold was your first product. What is it?

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I am not sure that everyone knows about Apache. What is it?

Apache is a free Web server. The Apache Group (*http://www.apache.org/*) was founded in early '95.

continued on page 92

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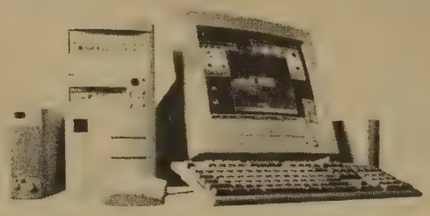

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After all the people at NCSA started working for Netscape, NCSA stopped doing Web server and Mosaic development. The people in the Apache Group had all been doing some development on the NCSA server and thought that the Internet community could not rely on NCSA to provide a free Web server to the Internet public. So, the Apache Group took the NCSA server and modified it, turning it into Apache.

Since then, the core has been completely rewritten and quickly, within less than a year, it became the number one server on the Internet.

Apache runs on every UNIX you can imagine—even some UNIXes that you cannot imagine—and there is currently an NT port in development. Currently, Apache and Apache-based Web servers run on a little over 50% of the domains on the Internet.

What is your relationship to the Apache Group?

I started using Apache at Community ConneXion as its Web server and realized what a great Web server it was. When I decided that Apache needed some encryption capabilities, I got involved in the Apache Group.

At first I just wanted to make encryption part of the Apache core. But because of patent licensing, trade secrets licensing, various partner relationships you have to get into, and export control laws, it was not really possible for Apache itself to have encryption built-in. Once I realized that we couldn't add it directly to Apache, I said, "I need to make a commercial version of Apache so that people could use strong crypto with Apache."

You do all of your software development off-shore. Why?

The reason is because we want to sell software worldwide. We don't want to limit our sales to within the US and Canada.

When Stronghold originally came out, it was just myself. I had written most of the commercial bits. A number of people asked, "Can you sell me Stronghold? I am in Germany." Because it is illegal to export strong cryptography from within the United States to outside North America, I couldn't sell them a version of Stronghold that was actually secure. I would have had to cripple it and make it insecure, then get an export license in order to sell it to these people.

Selling the customer a false sense of security is not something I want to do. I feel it is cheating the customer. Even though they know it is a crippled version, it gives people a false sense of security. If you have no encryption, you know you are not getting any security, but if you have some encryption, you might think you have security when you really don't.

You moved off-shore because the US government is actively regulating encryption. What is the international environment for encryption like?

The US government has been trying to bully other countries into adopting similar restrictions so that what we are doing can't be done, but they are not having a very good time of it. The Clinton Administration had hired this guy named David Aaron to go to the OECD meetings about cryptography and try to bully all these other countries into doing what the US wants them to do. He has since either quit or been fired and that position is unfilled. I think the US government has given up trying to bully other countries into adopting crypto restrictions.

On the Internet today, since cryptography is hardly used, any organized crime outfit or terrorist organization can rather easily break into banking systems and steal money from people's accounts.

Even if another country adopts crypto restrictions, it's extremely unlikely that they would do things as badly as the United States. For example, in France it is illegal to use cryptography without a license, which is actually a worse situation than in the US. However, a French citizen can write crypto in the UK, even if he can't use it when he goes back home.

If you are a US citizen, you are bound by US law even if you are outside the US. So, even though we do our development in the UK and Australia, we cannot hire US citizens or permanent residents.

Do you also have a domestic version of Stronghold or do you import copies?

We had to re-develop outside the States what was already developed inside the States. We do all of our development outside the States and then we import it to sell within the States.

Are other companies also doing crypto development off-shore?

Sun is doing off-shore development, but not quite the same way we are. They have a partnership with a Russian company so that they can sell strong crypto worldwide. But they are not using the same product inside the US. They have a separate product developed by this Russian company for outside the US and they use their own product within the US.

There are other companies doing strong crypto internationally, but they are not US-based companies doing development overseas. Data Fellows in Finland, Brokat in Germany, Baltimore in Ireland. I believe that we are the only company with subsidiaries overseas doing development for US and worldwide distribution.

How competitive is the market overseas?

In the Web server market we don't have significant overseas competition. But for our more crypto-specific products, the SafePassage line of products, there is more competition from these internationally-based companies.

SafePassage does what?

While Stronghold is a large product, providing a host of features, the SafePassage products focus just on crypto. They don't do very much else.

The SafePassage Web Proxy is an add-on product to any standard Web browser. For example, if you are in Germany using Netscape's browser, you can't connect to a Web site securely because your browser was crippled for export from the United States. With SafePassage Web Proxy, you would be able to talk to the server using full-strength crypto; your browser would talk to the Web Proxy and the Web Proxy would talk to the server. Because the browser talking to the Web Proxy is all within the PC, it doesn't matter if that is unsecured, but when Web Proxy is talking with the server, that link is secure because Web Proxy was developed outside the United States.

The SecureTunnel product is similar, except more abstract. It can be used for any TCP application. Let's say you have a database application that you wanted to make secure or you wanted to connect to your mail gateway securely. Just put SecureTunnel on both ends and it acts as a crypto proxy.

Web Proxy and SecureTunnel are not end-user products that people can just download

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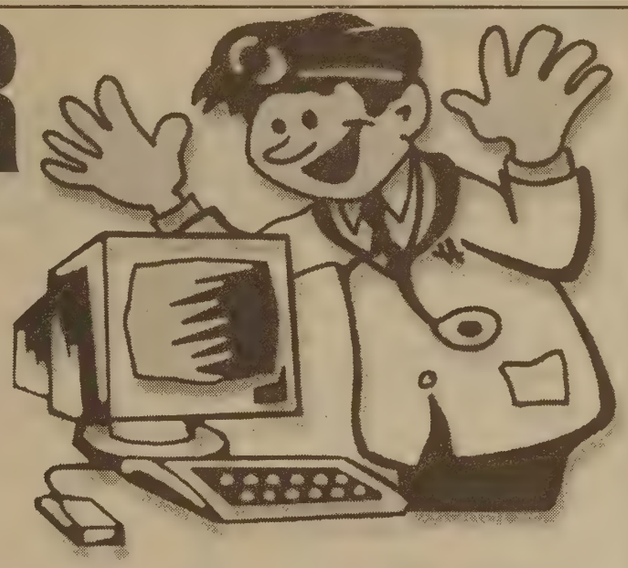

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and install if they want to use strong crypto. We sell to IS departments, corporations, and banks.

What are some of the things your customers are doing with these products?

The state of Victoria, in Australia, is doing a project where residents can access various government records through a Web browser. They have set up kiosks in shopping malls and you can download the software to your PC. Using standard Web browsers you connect to our Web Proxy product. Web Proxy is doing full-strength encryption to the Web server. The Web server is using Stronghold Crypto Engine product, which is sort of like Web Proxy for Web servers; it takes Microsoft Internet Information Server, Microsoft's Web server, and it adds full-strength cryptography. This gives the residents of Victoria the ability to talk to their government securely.

A number of banks in Europe have bought SafePassage Web Proxy to give to their customers. Their customers use it to securely check their balance, transfer funds, and do all the kinds of things you want to do in a home-banking application.

C2Net has partnered with several companies that provide certificates. Why?

One partner is XCert Software. They do certificate authority and public key infrastructure management software. If you were deploying cryptography within an organization you need some way of certifying individuals, certifying Web servers, making sure everyone is who they say they are. XCert develops and sells software to meet those needs.

We have also partnered with VeriSign and Thawte, but they just issue certificates and authenticate people.

There is a lot of certification and public key infrastructure issues in the crypto industry, which is why we partnered with all these PKI (Public Key Infrastructure) companies.

As the uses of crypto grows, it looks as though everyone will end up with having to keep track of a growing number of certificates issued by different businesses and Web sites. Will this create problems for individuals, for the end-user?

I don't think that having multiple certificates is really a problem. If you've got ten certificates that are all stored on your PC, they are all encrypted with one password. You only have to remember one thing.

However, if you've got ten different accounts on ten different Web sites, you have to remember ten passwords. If you are going to have to remember ten passwords, more often than not, you are going to pick the same password for all ten Web sites. That is incredibly insecure—you give your password to one Web site and that site can pretend they are you at another Web site. When all you are doing is reading the *New York Times* on the Web it doesn't matter, but when you are transferring thousands of dollars from one account to another account, it becomes more important.

If you have ten certificates, this is not really a problem. You will have ten certificates from ten different certificate authorities, and you use each certificate for different things. The Internet protocols are developed in such a way that it is most likely that you won't even have to worry about which certificate to present to which entities. That will be negotiated automatically by the computers.

There are a variety of issues discussed with crypto where the connections are not always obvious. For instance, freedom of speech. In early December (12/8/97), there was a Federal Appeals Court hearing on the Bernstein case regarding encryption and free speech. Can you help explain how these issues are linked?

There are a few free speech issues with respect to cryptography. One is that because of the export restrictions, US citizens are restricted in their ability to speak on the Internet. It is a cryptography-related issue, but it is only a free speech issue because the US government decided to make it into an issue.

What sorts of things are restricted?

Basically two things: They restrict the publication of source code and they restrict the provision of technical assistance to foreign persons. So, if I was in the States and someone outside the States sent me email asking, "How do I do such-and-such crypto," I couldn't say, "Do such-and-such." That would be technical assistance in the development of an encryption item, and is illegal.

It's important to remember that the same speech current US policy seeks to restrict on the Net is protected speech in print.

Right. Even though many people believe that electronic speech is also protected speech, that hasn't yet been determined by the Supreme Court.

During the hearing, someone said, "It was perfectly legal for Dan Bernstein to publish 5,000 copies of his source code, on paper, and drop them over Baghdad. But it would not be perfectly legal for him to put it on a floppy disk and send it to his colleague in Australia."

Yes, it is perfectly legal to speak on paper about cryptography, but it is not perfectly legal to speak electronically on cryptography.

Could you give a brief synopsis of the Bernstein case?

I have been going to all the hearings since '95. I have been bringing the whole company to the hearings too because it has been a lot of fun and the Appellate Court building is so beautiful.

Dan Bernstein wanted to publish a paper which included source code to cryptography on the Internet. So he applied for a license to do so with the Department of State and they denied that license. Then he got in touch with EFF and John Gilmore. They decided to sue [the government] because they felt it was a First Amendment issue.

In the Ninth Circuit District Court, Judge Marilyn Patel ruled that source code was speech, and therefore has the full protection of the First Amendment. Because it has full protection of the First Amendment the current crypto regulations were unconstitutional and therefore Dan Bernstein has the right to publish his cryptography on the Internet.

Two weeks after that ruling, the United States government removed the crypto regulations from the Department of State and inserted them in the Department of Commerce, making Judge Patel's ruling moot. Her ruling had to do with one set of regulations and those regulations did not apply anymore, now there were new sets of regulations. Even though the new sets of regulations were exactly the same, or 99% the same as the old regulations, Judge Patel's ruling—the Ninth Circuit District Court's ruling—did not apply anymore.

They had to have another hearing. And she reaffirmed the fact that, even though the regulations are now in the Department of Commerce, they are still unconstitutional, and therefore invalid, and therefore Bernstein has the right to publish crypto. Of course, the US government appealed that decision and [in December] there was an appellate hearing with three federal judges. (For more information, visit the EFF Web site at: *http://www.eff.org*)

Professor Bernstein wanted to publish his paper on the Internet so his colleagues could discuss it. If cryptography becomes ubiquitous and all digital communications are encrypted, will that pose a threat to such things as mail lists and newsgroups where open, fairly spontaneous conversation is crucial?

If you are on a mailing list and you want to talk about things to a wide audience, you are not going to encrypt it so that only a few people can read it. You are going to make it publicly available, but you are going to make sure that it

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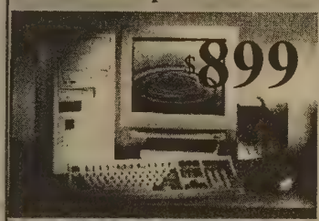

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is authenticated so that people know that you are the person who wrote it. Or that it's anonymous if you don't want anyone to know that you wrote it—and securely anonymous so that it can't be traced.

The deployment of anonymous communications, I think, has great potential for making open communication a lot easier. If people have the ability to speak anonymously, they will be less worried about saying sensitive things that will come back to haunt them later.

The point of everything being encrypted is that everything is encrypted from point-to-point, one-to-one communications. If you have a one-to-many communication you wouldn't be encrypting that. The only thing you might be encrypting is the origin, not the actual content.

And for anonymity, in the physical world there are laws guaranteeing anonymity for distributing political leaflets, for instance. Are there parallel protections on the Net?

It is still relatively undefined. The current belief is that the right to speak anonymously will translate to the Internet if a case about anonymous speech on the Internet came up. This is based on various case law not related anonymity, such as *Reno v. ACLU* (the CDA) and other Internet-related case law.

However, some people want to make anonymity on the Internet illegal. All of the laws proposed to ban spam also ban anonymous email. While I am no friend of spam, and would certainly want all the people who send spam to go to jail, I cannot support something that is going to ban anonymous speech on the Internet. I believe that anonymous speech is fundamental to free speech.

Do digital watermarks help verify the authenticity of a message?

Watermarks are a copyright issue, as opposed to a authentication issue. If I post something and want tons of people to read it, and I don't care about making money, then all I want is for all the people to know that I wrote it.

If I wanted to make money, and I wanted everyone who read it to pay a dollar, then I would have to have a watermark. So, for instance, if I gave you a document and you posted it on a Web page but I didn't want to you to post it on the Web, I could go to that Web page, look at it and say, "This is from a copy I gave you" and sue you.

In the physical world, watermarks are often an authentication issue. On currency, watermarks are used for authentication. But on the Internet, watermarks are meant to be used for copyright protection.

So, digital signatures are used for authentication?

Right.

Do digital signatures also help ensure that a document has not been altered? Are these issues coupled or separate?

The authentication and the integrity of a document are pretty coupled. If I've got a document and wanted to sign it, I would take the document and do a hash, and sign the hash.

A hash is...?

A hash is a mathematical function on the document, which is one-way. I could take the document and turn it into a hash, but then I couldn't turn the hash into a document. And based on the hash and the document, I couldn't create another document which generated the same hash. Then the hash gets signed.

I think that when companies realize that there is this huge risk they are opening themselves to, they are going to force their customers to talk to them in a secure manner.

If the document is changed, when someone tried to verify it, they would do a hash of the document and would see that the hash of this other document is different from the hash that I had signed.

Is the control of personal information an encryption issue?

Controlling personal information is an extremely difficult task. I recently moved to a new house and I am trying to make sure that my address and my phone number are relatively restricted from public view. Before, when my business was at home, I wasn't doing much to prevent my address from being public. Now there is no reason for people to know my address. I have been trying to protect it and have realized how difficult a task it is.

Encryption does not make it a simple task, but it's a powerful tool to help people protect private information about themselves. I think that it's every individual's personal responsibility to protect their private information. I don't think that the government should pass laws saying that you can't ask someone for information and if they give it to you write it down. If I ask you for some personal information and you give it to me and I write it down and I give it to my friend or sell that information, you gave away that information in the first place. Companies have the right to do with it what they will.

Not everyone agrees with that position.

Right, not everyone agrees with that, but I believe it is everyone's personal responsibility to protect their own private information. And vendors and companies have an obligation to be upfront about what is going on. If I told you, "Give me your address, I am not going to tell anyone," and I tell the whole world by putting it up on my Web site, that's not right. But if I tell you, "Give me your address, and I'll send you junk mail," and you give me your address, there is no reason to be upset when you start getting junk mail.

At a conference I recently attended, someone made the comment that when browsers include certificates it will be it easier for commercial Web sites to gather more personal information about who visits their sites.

If it is not implemented right it would be easier for commercial Web sites to gather more information from the certificates. However, it is possible to implement a certificate system where you don't put any personal information in the certificate. It doesn't have your name in it, but is still assigned to you. You could present that type of certificate to sites that want a certificate, but you would not be giving them any details about yourself. Web sites can actually get value out of that by having a persistent identity and being able to understand their customers a little better without having to understand specifics about specific people.

The Net also makes it easier to aggregate information and re-purpose it.

Right, on the Net it is easier to collect information and it makes it more difficult to protect personal information. But encryption makes it easier—no, it doesn't make it easier, it gives people more tools to protect personal information about themselves. ■

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CRYPTO WARS IN CONGRESS

NSA/FBI Push Key Escrow, Industry And Civil Libertarians Object Vigorously

By Ivars Bezdechi

As Washington lawmakers grapple with media-sexy subjects such as "pornography on the Internet" and other material considered in some circles to be "inappropriate," a heated debate on the ramifications of data encryption in a new world goes on behind the scenes, raising questions about free speech rights, privacy rights, freedom of information, and the interests of law enforcement and national security.

The basis of the entire controversy is the Clinton Administration's proposed Security And Freedom through Encryption (SAFE) Act (sometimes referred to as the "key escrow," "key recovery" or "Clinton Clipper III" act) which also contains provisions that would curb export of encryption software and technology to other countries. This law would force everyone who wants to encrypt a message or electronic files on a server or personal computer hard disk to hand over copies of the key to an outside entity or company. If a law enforcement agency on a local, state or government level is served with a warrant, the "key" to decode the files would be handed over by the third-party to the law enforcement agency. The rule would encompass Internet messages, financial and checking account records, word processing records, and the contents of any other computer files which would be of interest to a law enforcement agency doing an investigation. (The "escrow" part of the term refers to the escrow-like capacity of the entity—private or otherwise—holding the encryption key.)

The chief proponents of the federal proposal, the Federal Bureau of Investigation (FBI) and National Security Agency (NSA) argue that they need the stringent "key-escrow" scheme to effectively manage investigations which might involve information stored as data on computers as well as transmissions made over the Internet, just as they now possess the sophisticated technology needed to wiretap conventional phone conversations.

Although the proposed legislation also includes rulemaking which would broaden controls on the export of encryption technology to other countries, the debate over SAFE and another bill called "Promotion of Commerce Online in the Digital Era" (or in short, "PRO-CODE"), has shifted from an effort to relax export controls, to a concentrated effort against the broad new domestic controls and mandatory government access to private communications.

The Trouble With Key Escrow

While the government's position on the issue may be understandable on one level, opponents to the measure are leading the charge in questioning the integrity of the key escrow holders, who, in a sense, will end up guarding the chicken coop.

An undetected breach of security within the agency entrusted to keep the secret code could present a gigantic problem for every one of the key escrow agency's customers when such information falls into the hands of someone other than an authorized law enforcement agency. As a result of a security breach, the agency would then have to contact every customer and then issue new keys (assuming that they have the integrity to admit their own shortcomings in allowing such a breach to happen). Once the breach was identified and dealt with, those customers would need to immediately start using the new keys and then re-encrypt every document that used the old key.

Computer industry experts predict that the sheer financial cost of President Clinton's proposal will be astronomical, and that most agencies and companies will operate around limited liability guarantees; and that in case of a security breach, the policy will cause them to be tied up in endless court cases.

Counter-Escrow Arguments

The Washington, DC-based Center for Democracy and Technology (CDT) (*www.cdt.org*) has offered a "my lock, my key" approach, which it considers to be more reasonable and functional overall.

In tandem with CDT's lobbying efforts, a

group of leading cryptographers and computer scientists released a report last May which examined the risks and implications of government-designed key escrow systems (*www.bsa.org*). The report, in part, cautions that, "the deployment of general key-recovery-based encryption infrastructure to meet law enforcement's stated requirements will result in substantial sacrifices in security and cost to the end user. Building a secure infrastructure of the breathtaking scale and complexity demanded by these requirements is far beyond the experience and current competency of the field."

In simple language, says Jim Dempsey, senior staff counsel for the CDT, these pieces of legislation are attempting to build something that can't be built. He says, "If you build it, or try to build it, you're going to make a mistake. The scheme they are trying to build will be too vulnerable. Trying to control all of these keys, and trying to keep track of all of these keys, and to do it without making mistakes, is simply not possible."

The "Security And Freedom Through Encryption" bill would force everyone who wants to encrypt a message or electronic files to hand over copies of the key to an outside entity or company.

He says that the key escrow proposal offered by the Clinton Administration and the FBI is a profoundly vulnerable system. Individuals who use the Internet (whether for banking, commerce, relationships, or maybe in the future, "tele-medicine" by consulting with doctors over the Internet) are probably not aware that all of those transactions without strong encryption are "insecure" or can be easily intercepted by a third-party.

"The key recovery [escrow] proposal offered by the administration is another window of vulnerability that will seriously affect the individual," Dempsey says. "The Internet as it stands now is very insecure. Its openness and networked nature makes it insecure. The only way to make it secure is through good security, brought forth with encryption which is easy to use, and as one person has said, 'double-click easy.'

"Right now, encryption in the voice communication world is most important with respect to wireless telephones, of which there are about 40–50 million customers," he adds. "The wireless telephone is an increasingly popular and seamless component of our telephone system. The security of wireless communications is very important. Encryption is central to any security program."

Balancing Act

Dempsey and the CDT clearly are not advocating a world where encryption and data protection and the interests of law enforcement cannot coexist. They simply want a policy that is technologically workable and protects free speech rights—which includes no government-sponsored domestic controls and substantial reform of laws governing the export of encryption technology outside of the United States.

Currently, strong and virtually unbreakable encryption schemes are widely available overseas, but US companies are expressly prohibited from exporting strong encryption products.

"This has had the effect of inhibiting the spread of encryption internationally and domestically, and that has left the Internet and other communications infrastructures vulnerable. We believe that law enforcement will have many avenues available to it, even in a world of widespread encryption," Dempsey says. "Law enforcement will not be crippled by the widespread use of encryption, and in fact, the widespread use of encryption will prevent crime."

The War Drags On...

Groups such as the CDT, the Internet Privacy Coalition, Electronic Frontier Foundation and Voters Telecommunication Watch have been successful in thwarting some of the most egregious "Big Brother" provisions of government-sponsored encryption legislation.

However, Dempsey is not ready to claim victory. He described these different proposals and counter-proposals and amendments as being in "perilous gridlock."

"We've never had controls domestically on encryption technology. But the FBI's proposal would be devastating to the future of the Internet," he says.

Dempsey attributes the administration's and government law enforcement's "Big Brother" approach to "the fear of having to do things in a different way."

"The FBI is trying to fight the technology rather than use the technology to its benefit," he argues. "In a technological environment which is characterized by decentralization and user control, the FBI is trying to impose centralized decisions and centralized structures on the user of controls—in this case, by depriving the user of the control and use of his or her keys." ■

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Online Resources:

Center for Democracy and Technology

URL: *http://www.cdt.org/*

The Center for Democracy and Technology, a non-profit public interest organization based in Washington, DC, works to develop and advocate public policies that advance constitutional civil liberties and democratic values in new computer and communications technologies. Its Web page includes more information about pending encryption legislation at *http://www.cdt.org/crypto/* .

Internet Privacy Coalition

URL: *http://www.privacy.org/*

The mission of the Internet Privacy Coalition is to promote privacy and security on the Internet through widespread public availability of strong encryption and the relaxation of export controls on cryptography.

Encryption Policy Resource Page

URL: *http://www.crypto.com/*

The Encryption Policy Resource Pages is an issues-oriented place on the Web for information about the United States' encryption export restrictions. The Web site also maintains an "adopt a legislator" email program at *http://www.crypto.com/member/* for concerned netizens.

Voter's Telecommunications Watch

URL: *http://www.vtw.org/*

The Voters Telecommunications Watch (VTW) is a New York-based citizen-based Internet civil liberties group. It organizes citizens in individual Congressional districts, lobbies state and federal legislation, and occasionally raises money for a worthy cause, but never itself.

Rep. Goodlatte's Encryption Page

URL: *http://www.house.gov/goodlatte/encryption.htm*

Latest news about pending encryption legislation from Rep. Bob Goodlatte (R-VA).

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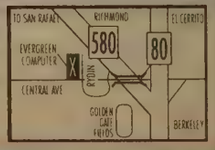

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BMUG • By Peter Linde and Sam Penrose

Encryption, Privacy, And Your Macintosh

Two Views Of PGP

In our column this month, Sam will start off with some cautionary advice about encryption of data; then I'll talk about why I feel so strongly that everyone should encrypt just about everything, and give some brief instructions on how to get, install, and use PGP for the Mac.
—*Peter*

Playing With Guns

By Sam Penrose

The US government defines strong encryption software as a "munition" and threatens to jail those who export it for threatening the national security. Computer pundits see strong encryption software as a tool for preserving the liberties that make America worth fighting for.

I tend to agree with the pundits' arguments against regulation, but some preliminary research on cryptography suggests that they may have something to learn from the government as well.

The first problem with strong cryptography is that it works. Once you've encrypted a file with PGP or another standard of equivalent robustness, it can only be recovered with the proper key. Lose the key, and you have lost the file.

O'Reilly and Associates has a book out on the leading personal cryptography product: *Pretty Good Privacy* by Simson Garfinkel. Its sections on cryptographic theory and history are wonderfully clear. I originally planned to review *PGP* (the book) for this column, but Garfinkel hasn't updated it in three years.

PGP doubles as a manual, which is great if you want to use v2.6 for DOS or UNIX. The software has now passed release 5.0. If all you want is background and you don't mind paying $30 and leafing through pages of outdated software tips, Garfinkel's *PGP* is a great book.

If there is a book on PGP written since 1995, I can't find it. For breaking information on PGP, check the *comp.security.pgp* and *alt.security.pgp* newsgroups, or visit the links page listed at the end of this piece. There are five "current" versions of the program, so be prepared to do some research.

Rather than add to the chorus of praise for PGP, this piece will look at some problems with the technology as explained in Garfinkel's book.

Be Careful What You Ask For

The first problem with strong cryptography is that it works. Once you've encrypted a file with PGP or another standard of equivalent robustness, it can only be recovered with the proper key. Lose the key or the key's pass phrase (what you type to access the key), and you have lost the file. Keep a copy of the file or your passphrase lying around, and your "strong" cryptography becomes not so strong, making the exercise somewhat pointless.

Verify, But Don't Trust

Concealing your key doesn't have to be a problem if you only want to secure a file while it's in transit. For that situation, the preferred method is "public key" cryptography. A public key is a very large number mathematically related to another very large number, the corresponding "private key," in such a way that the private key is very hard to identify if all you have is the public key. This relationship allows the wide distribution of a public key for encrypting files that can only be decrypted by the holder of the private key. Thus I can post my public key on my Web page and you can use it to send me a file that can't be read even by others who have visited my page unless they break the underlying cryptography or have access to phenomenal computing power.

Public key cryptography has its own inherent problem. You turn to cryptography because you don't trust someone: your coworkers who might snoop on your hard drive or the general Internet population who might read your email. Ironically, every use of public key cryptography is inherently an act of trust. To encrypt a file with a public key is to say that you trust that the public key belongs to a specific person. (It may also say that you trust that person to handle the file and their own private key appropriately, another iteration of the first problem inherent in all strong cryptography.) If your best friend hands you a floppy disk saying "here's my public key," the need for trust may not seem like such a big deal. But how many people do you know that well?

There is a partial workaround to this problem, the Web of Trust, which

continued on page 106

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*Prices do not include Hard Disk, Display or RAM

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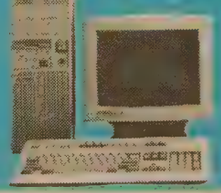

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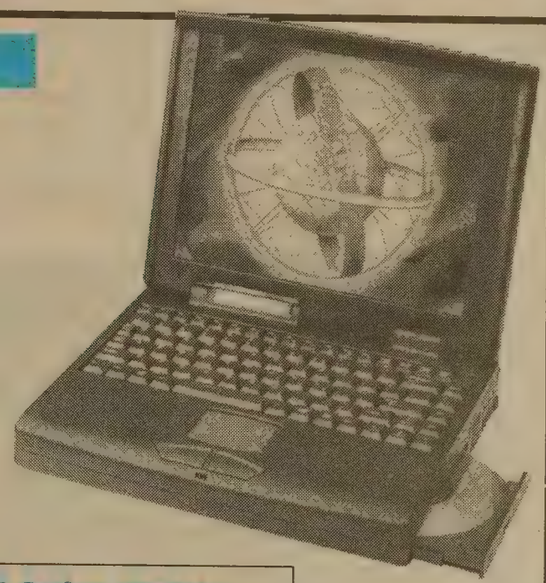

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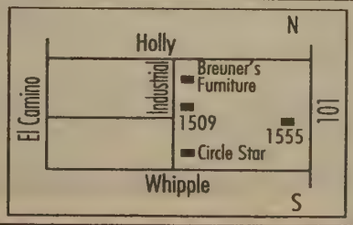

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 continued from page 102

relies on the fact that public key cryptography can be used to authenticate messages as well as encrypt them. Via another mathematical function, I can use my private key to "sign" a message in such a way that anyone with my public key can verify that it came from someone with access to the private key for that public key and that it hasn't been tampered with in the interim. By signing someone else's public key, I verify it for anyone who trusts my public key. As a consequence, you can expand your "Web of Trust" as far as your friends' signatures will take it. What you can't do is to expand it as far as your friends' acquaintances' signatures will take you. If you see a friend's signature on a stranger's public key, your friend is certifying the stranger's identity (in practice, their name and email address), not their trustworthiness for verifying the keys of other strangers or any other purpose.

This can be a subtle distinction, as I recently learned to my regret. I vouched for an email acquaintance named "Smith" to another email acquaintance who wanted to buy a computer. There are actually two Smiths, Smith and Smith Jr., and neither I nor the buyer remembers whether he specified one of them. At any rate, the one I trusted was Smith, and the vendor was Smith Jr. Maybe the query was ambiguous or maybe I just blew it, but the upshot is that Smith Jr. turned out to be a rip-off artist. Public key cryptography might have helped with the confusion over Smith versus Smith Jr., but I would have vouched for Smith Jr. on the basis of knowing his father anyway. I confused identity with trustworthiness, which is a mistake that public key cryptography can't prevent. For that reason, its effective use requires constant vigilance.

No Such Thing As An Unloaded Gun

The underlying problem with strong cryptography programs is like the underlying problem with guns: they are powerful tools, but only those with training and discipline can use them safely and effectively. The government's decision to call strong cryptography "munitions" may be a way of enforcing a bad policy. The analysts who oppose restrictions on cryptography may be fighting the good fight. But too many of them portray PGP and similar software as utilities for accessorizing your computer, with the civil liberties angle thrown in for cachet. These are serious programs whose use and misuse entail serious consequences. Want to play around with them? Don't forget that you are playing with guns.

PGP: Get it, Use It

By Peter Linde

I am going to take a pretty strong stance about PGP: Everyone should get it. And everyone should use it. Not just on your truly important or confidential mail and documents, but on everything you send or transfer to another computer, as well as personal or confidential documents that you keep on your own hard drive.

I don't believe in strong encryption (without government key recovery, by the way) because of the semi-wacky arguments that it provides the last and best defense against a police state. I believe in it for one simple reason: privacy.

I'll give you a few examples of what I mean:

Example #1: I once heard a computer consultant joke, "You can hide it from your priest. You can hide it from your therapist. But you can't hide it from your computer consultant." I knew exactly what he meant. At my consulting company, we are regularly called upon to recover our client's data from their crashed hard drives. We use standard tools available to anyone. At minimum, those tools display to the person performing the recovery the name of every file on a hard drive.

continued on page 114

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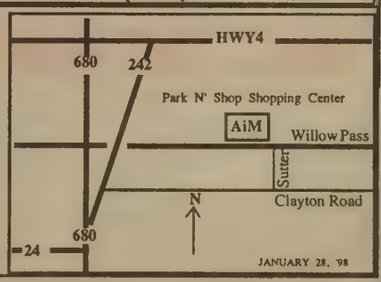

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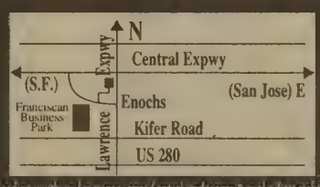

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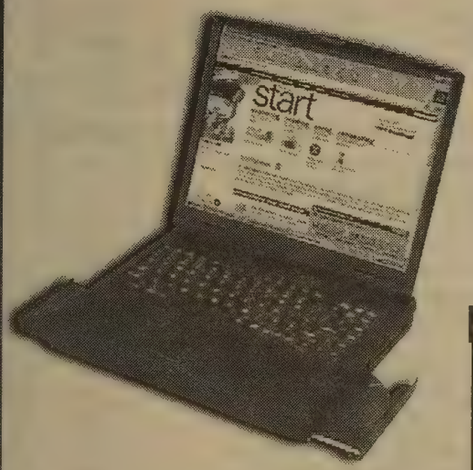

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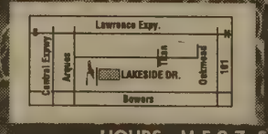

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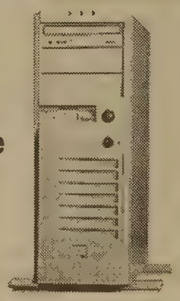

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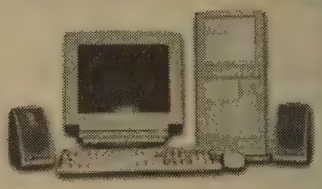

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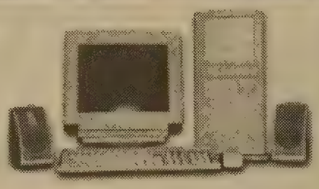

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- Mitsumi Win95 Keyboard
- Logitech Mouse
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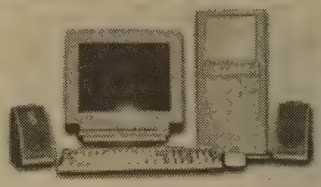
- Monitor Not Included



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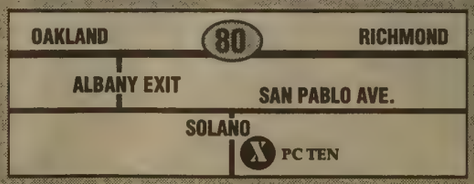

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Sony 2X6 Int Retail SCSI	365
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MICRO MARKETPLACE MM MICRO MARKETPLACE

 continued from page 106

In worst case crashes, we occasionally must look inside the files to make sure that we are recovering the real data.

You wouldn't believe what I have seen. Maybe you would. Go look at your own hard drive and imagine that your boss or some stranger had free access to everything on it. See anything you might like to hide?

Someone walked into the fourth-floor office of a vice-president of one our large clients and walked out with his PowerBook. That PowerBook had on it the details of a billion-dollar merger that the VP was in the process of negotiating.

Example #2: Someone walked into the fourth-floor office of a vice-president of one our large clients and walked out with his PowerBook. That PowerBook had on it the details of a billion-dollar merger that the VP was in the process of negotiating. Fortunately, the data was backed up, but one is left to wonder if this was a random theft or an act of industrial espionage.

Example #3: That email you just sent. You may think of it as a private conversation between you and the recipient, but in fact, many people can read every word you wrote as it travels from your machine to the machine of the person to whom it is addressed.

First off, if your computer is on a network, anyone with a simple packet analyzer (they are available for free on the Web) can read everything as your post travels from your machine to your mail server. Once your post makes it to your mail server, anyone with physical access to that server can read your mail. They may even be able to set up the server such that it automatically forwards a copy of any mail addressed to you to their own account. In fact, most corporations reserve the right to view the contents of email sent or received by their employees.

Computers and email make our lives so much more convenient, yet the nature of digital storage and transfer of information is the very problem. As any software vendor can tell you, it's just too easy to make copies. Each leap in information technology, from monks copying manuscripts by hand to modern computers, has allowed for information to be copied more quickly, more accurately and more efficiently.

There has probably never before been a method of communication and data storage that people believed to be so secure, and yet was so easily breached as computer disks and email systems.

Many people believe that sending an email is like sending a letter or even making a phone call. They have come to count on these systems of communication to be private. Of course, all can be breached. But none so easily as computer-based systems. For example, before the government can listen in on your phone calls, they need to go through a significant legal process. They then have access to equipment and methods that the average citizen just doesn't have. I am not saying that others can't tap your phone,

continued on page 121

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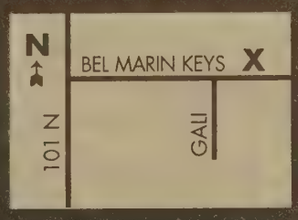

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Thank you for lending us the Pentium 133mhz systems for the CGDC (Computer G... Developer Conference) and WINHec (Windows hardware engineering conference) shows. The systems were great and were very reliable. I also appreciate the two Pentium P166mhz systems that you were able to put together within a few hours.

Once again, I like to thank you, and your staff for your invaluable contribution. W...

Ken Wu
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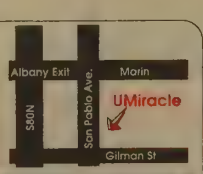

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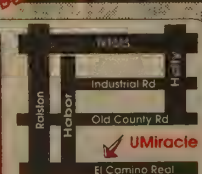

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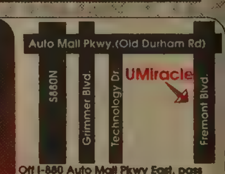

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Vice President

TREEHOUSE SOFTWARE CONSULTING GROUP

July 25, 1996

Tony Nguyen
Sales Representative
UMiracle Microsystems, Inc.
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Tony,

I just wanted to drop you a note of appreciation for your work in delivering our 3 SuperMicro Dual P6 Pro computers. The computers are great! They run Windows NT flawlessly. Installation was a breeze because UMiracle made sure that the computers shipped with all the proper drivers for Windows NT 3.51. Everyone who visits us is green with envy, and we have passed your company's name along with our highest recommendations.

Thanks once again.

Jeff Stock
Sr. Partner
Treehouse Software Consulting Group

227B Berkeley Way ■ Santa Cruz, CA 95062 ☎ (408) 427-2062

Intel DK440LX PII Dual

- Intel DK440LX Dual Pentium II Motherboard 82440LX AGPset - 233Mhz & above Dual CPU support, 440LX AGPset w/ Accelerated Graphics Port Connector for optimal Video Graphics,4 DIMM slots,Onbrd I/O,UltraDMA PCI IDE,onbrd Intel Pro10/100BT Ethernet/ Adaptec 7895 Dual Channel SCSI w/ RAIDport slot
- Intel Pentium® II 512K Processor(s) w/ Cooling Fan(s)
- 64MB 168Pin 10ns SDRAM DIMM w/EPROM chip
- 1.44MB Floppy Drive
- 3.2GB Quantum FireBall SE33200S Ultra-SCSI-2 HD
- Mitsumi 24X Speed Internal ATAPI IDE CD-ROM
- ATI Xpert@Work AGP RAGE PRO 8MB SGRAM Video Card
- 19" Hitachi CM-751MU .22DP 1600x1200NI Monitor
- Premium ATX style Full Tower 235W ATX PS
- Liton SK6000 Ergonomic Win95 Keyboard
- Logitech 3-Button MouseMan Serial Mouse w/ Pad
- Pair of 120Watt Stereo Speakers
- Legitimate MS Windows NT V4.0 Workstation CD + Manual + installed + fully configured

Bundled with AGP Video card!

Single Pentium II
233MHz $2754
266MHz $3002
300MHz $3219
Dual Pentium II
233MHz $3038
266MHz $3533
300MHz $3968

PII is here!

MULTIMEDIA NOTEBOOKS

NoteBook Options:		
	MS DOS V6.22 + Windows V3.11	Add$100
	MS DOS V6.22 + WFWG V3.11	Add$120
	Windows 95 CD Full OEM Version	Add$90
	Windows NT 4.0 Workstation/Server OEM	Add$180/$650

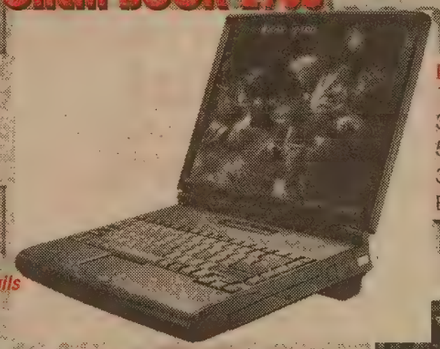
CHEM BOOK 2700

CHEMBOOK 2700 ■ P5 MMX ■ TX-Chipset ■ Active 14.2" 1ku768 ■ 32MB EDO ■ 512K L2 Cache ■ 1.44FD ■ 20X CDROM ■ 2MB EDO Video ■ TouchPad ■ 3D Stereo Sound ■ RCA Jack ■ USB.1S/1P ports ■ Li-ion Battery...

Active Matrix 14.2"	(2.1/3.0/4.0GB)
■Pentium-166MMX	$2441/$2565/$2729
■Pentium-200MMX	$2529/$2653/$2817
■Pentium-233MMX	$2626/$2750/$2915

CHEM 2700 NoteBook Options

8/16MB 144pin EDO	$48/72
32/64MB 144pin EDO	$120/275
Auto Adaptor 12V	$75
AC Adaptor	$80
Li-ion Internal Battery	$185
Port Replicator	$125



Harddrives/PCMCIA cards•

1.4/2.1GB Slim HD	$190/220
3.0/4.0GB Slim HD	$355/530
5.0GB 2.5" 19mm HD	$665
33.6K/56K modem	$89/135
Ethernet NE2000 Comb	$80

See WWW.CHEMUSA.COM for details

CHEMBOOK 9780 ■ CPU upto IMM233MMX ■ 430TX Chipset ■ Active Screen 12.1"/14.1" w/512K Cache ■ Upto 128MB SDRAM ■ Removeable 1.44FD ■ 24xSpeed CDROM ■ 4MB EDO VRAM ■ Li-ion Battery ■ 3D Surround Stereo Sound ■ Video in/Out ■ USB/1S/1P ■ InfraRed port ...

(3.0/4.0/5.0GB HD)	Active Matrix 12.1	Active Matrix 14.1
■ P5-166Mhz MMX+32MB	$2168/$2333/$2456	$2768/$2933/$3056
■ P5-200Mhz MMX+32MB	$2256/$2421/$2544	$2856/$3021/$3144
■ P5-233Mhz MMX+32MB	$2354/$2518/$2642	$2954/$3118/$3242

CHEM 9780 NoteBook Options

16/32MB SDRAM	$80/140
64/128MB SDRAM	$285/$550
Int. VoiceFaxModem 56K	$150
Li-Ion 2nd Battery	$185
Docking Station	$449
Port Duplicator	$175

See WWW.CHEMUSA.COM for details

CHEM BOOK 6000

CHEMBOOK 6000 ■ New Intel (IMM) 233MMX CPU ■ 13.3" Active XGA ■ 16MB SDRAM onbrd ■ 430TX/512K Cache ■ UDMA-IDE ■ 20X CDROM ■ 2MB 128Bit Video ■ TouchPad ■ 3D Stereo Sound ■ S-VideoTVout ■ USB/1S/1P ■ Li-ion 58W ■ Health-Monitorg...

With IMM 233MMX CPU	16MB	32MB
2.1GB Slim HD	$3502	$3575
3.0GB Slim HD	$3626	$3697
4.0GB Slim HD	$3790	$3863

CHEM 6000 NoteBook Options

16/32MB SDRAM	$80/140
64/128MB SDRAM	$285/$550
Others	$call

See WWW.CHEMUSA.COM for details

CHEM BOOK 9780

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Also available ChemBook 7000 Series with 15.1" Active Matrix Display! Call for Details and Availability!!!

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What is RAID?

RAID is an acronym for Redundant Array of Inexpensive (or Independent) Disks. A RAID array is a collection of drives which collectively act as a single storage system, which can tolerate the failure of a drive without losing data, and which can operate independently of each other. Among all RAID implementations, AAA-130 series, the latest Adaptec RAID 5 solution, is the most cost-effective way to protect your data. If the data in your file server is vital to your survival of your business, RAID-5 is the way to go!

Thunder 2 Dual PII

- TYAN Thunder-2 ATX S1696DLUA Dual Pentium II 233-300 MHz System Board - 1 AGP+5 PCI+2 ISA Slots, 4 168Pin DIMM for Max 1GB, Onbrd Adaptec 7895 dual channel U-Wide SCSI with RAIDport option, Yamaha PCI Wavetavle sound, Super IO/FD/IDEs/USBs/PS2, Flash AMI BIOS
- Intel Pentium® II CPU(s) w/ Cooling Fan(s)
- 64MB 168Pin 10ns SDRAM DIMM w/ EPROM
- 1.44MB Floppy Drive
- Three 3.2GB Quantum FireBall SE33200S Ultra-SCSI-2 HDs
- Mitsumi FX162T 16X Speed Internal ATAPI IDE CD-ROM
- Trident 9685 PCI 1MB MPEG+AVI Video Card
- 14" ShamRock 1Kx768NI Pwr-Saving Monitor
- GigaStar ATX style Medium Tower 235W ATX PS
- KeyTronic 104 Key Win95 PS/2 Keyboard
- MicroSoft Ergonomic PS/2 Mouse w/ Pad
- Legitimate MS Windows NT V4.0 5-user Server CD + Manual + installed + fully-configured

Single Pentium II
233MHz $2627
266MHz $2875
300MHz $3092

Dual Pentium II
233MHz $2911
266MHz $3406
300MHz $3641

PII is here!

Call for AGP Video card UPGRADE!

RAID-5 AMI Quad P6

- AMI (American Megatrends, Inc) Goliath Quad Pentium® Pro Processor EISA/PCI motherboard - U.S. designed & made 180/200MHz (or higher) 1/2/4 processors supported, easy processor upgrade thru CPU based board approach, 1GB memory max onboard with 168pin slots, 4 way interleave structure for max performance ECC supported, 168Pin DIMM supported, Intel 82450GX chipset, AMI Green Flash BIOS, 6 PCI + 4 EISA slots, Integrated I/O w/ 1P/2S/FD/ IDEs/PS2 mouse
- Genuine Intel Pentium® Pro Processor(s) w/ Cooling Fan(s)
- 64MB=32MBx2 168Pin 4Mx72 EDO ECC Buffered DIMM
- 1.44MB Floppy Drive
- Mitsumi FX162T 16X Speed Internal ATAPI IDE CD-ROM
- DPT SmartRAID IV RAID-5 PM-3334UW/2 UWide SCSI PCI 2 channels Controller w/16MB ECC cache for protection
- Five 3.2GB Quantum FireBall SE33200S Ultra-SCSI-2 HDs
- Trident 9685 PCI 1MB MPEG+AVI Video Card
- 14" ShamRock 1Kx768NI Pwr-Saving Monitor
- Heavy-Duty Server Case Model LT-18 supporting 11 drive bays, 26"x10"x25", removable front & side doors, Lockable front door for security, "snap-in" drive mounts, swing-out feet
- 400W AT Size Turbo Power Supply special-designed for AMI Goliath with 12V/5V/3.3V DC output
- KeyTronic 104 Key Win95 PS/2 Keyboard
- MicroSoft Ergonomic Serial Mouse w/ Pad
- Legitimate MS Windows NT V4.0 5-user Server CD + Manual + installed + fully-configured

P6 is here!

ULTRA WIDE 40MB/S Ready!!!

Intel Pentium® Pro
Dual 200MHz 256/512k $9801/$10824
Quad 200MHz 256/512k $13439/$15483

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TIGER PII RAID5 Server

- Tyan Tiger Single ATX (S1692S) - Pentium II board, 233Mhz & above CPU support, 440LX AGPset with Accelerated Graphics Port Connector for optimal Video Graphics, 3 PCI/2 ISA/1 AGP slots, DIMM, Onbrd I/O, UltraDMAIDE, ATX
- Adaptec AAA-131 RAID 5 Ultra-Wide Adapter with 1MB Cache onbord
- Genuine Intel Pentium® II Processor(s) w/ Cooling Fan(s)
- 32MB 168Pin 10ns SDRAM DIMM w/ EPROM
- 1.44MB Floppy Drive
- Mitsumi FX162T 16X Speed Internal ATAPI IDE CD-ROM
- Four 3.2GB Quantum FireBall SE33200S Ultra-SCSI-2 HDs
- Trident 9685 PCI 1MB MPEG+AVI Video Card
- 14" ShamRock 1Kx768NI Pwr-Saving Monitor
- GigaStar ATX style Full Tower 235W ATX PS
- KeyTronic 104 Key Win95 PS/2 Keyboard
- MicroSoft Ergonomic Serial Mouse w/ Pad
- Legitimate MS Windows NT V4.0 5-user Server CD + Manual + installed + fully-configured

Pentium II
233MHz $2870
266MHz $3117
300MHz $3335

PII is here!

Call for AGP Video card UPGRADE!

NT ENHANCEMENTS

NT Guaranteed! All hardware listed below are guaranteed to be NT V4.0 compatible. We will make it right or your money back!

■ **Memory**
- 16/32/64/128MB 10ns SDRAM UnBuffered 168Pin DIMM for 430VX/TX ..... $Call
- 32/64/128MB 10ns SDRAM UnBuffered 168Pin DIMM w/EEPROM for 440LX ..... $Call
- 16/32/64/128MB 60ns DRAM ECC EDO Buffered 168Pin DIMM for 440FX ..... $Call

■ **RAID 5 Fast Ultra Wide SCSI-2 Host Adapter (for RAID-5 implementation, an IDE HD as boot drive is recommended)**
- DPT SmartCache IV SCSI Adapter & RAID Series/SmartRAID IV RAID Series ..... $Call
- Mylex DAC960 Series Hi-Performance PCI RAID Controller with upto 3 UW SCSI channels supporting 45 HDs, upto 64MB Cache installable ..... $Call
- AMI Complete MegaRAID Solution Including:SCSI RAID level 0,1,3,5,10,30, and 50 PCI Disk Array Controllers/FlexRAID/Advanced Management Software/Advanced Enclosure Management/Boot-Up Configuration/Power Console/General Alert ..... $Call

■ **High Capacity Tape Drive**
- HP DAT SureStore 2000/5000 DAT8/DAT24/DAT24x6E Tape Drive ..... $Call
- HP DAT OEM C1534A-2GB/C1536A-4GB/1599A-8GB/C1554A-24GB/C5648A-144GB ..... $Call
- Seagate Scorpion 24GB Internal DDS-3 DAT Drive $919
- Seagate SDDS-DC DAT Internal Drive STD24000N 4GB/STD28000N 8GB ..... $629/$73•9
- Seagate 32GB DAT DDS-2 Autoloader 4586NP (4 DAT Tape Support) $935
- Optional 12 Tape Magazine for above 4586NP upto 96GB (no tape) $135

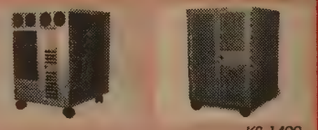
■ **High End Video Card - 3D Rendering/Graphic Animation/OpenGL**
- Symmetric GLyder MAX/TX-16/TX-40/MP-40 3D Accelerator ..... $Call
- Dynamic Pictures OpenGL Accelerator Oxygen102/202/402 ..... $Call

■ **Server Chassis (T-101)/Disk Array Chassis (T-103): Dimension=13"x31"x22" w/Dual Redundancy & Hot Swappable Power Supplies ..... $880/$880**
- T-101: 12 DriveBays/Upto 2 PowerSupply 2x300W 2x4.6" Smart Fans w/ Efficient Air Flow Full Size AT Motherboard FormFactor
- T-103: 16 DriveBays/Upto 2 PowerSupply 2x300W 2x4.6" Smart Fans w/ Efficient Air Flow Perfect RAID Disk-Array Sub-Chassis

■ **Server Chassis LT-18 By Axxion w/o Power Supply.....$480**
- Full-size AT, Baby AT, oversize AT based boards, 11 drive bays (one 3.5" and four 5.25" exposed, six 5.25" hidden bays), Twelve slots, "snap-in" drive rails, secondary cooling fans, accepts standard power supply. Dimensions: 26" x 10" x 24.5" (DxWxH),

LT-18 by Axxion

■ **Server Enclosure KS-1400 w/ Dual Redundant Hot-Swappable 300Wx2 PS.....$910**
- Full-size AT, Baby AT, oversize AT based boards, 14 5.25" drive bays, Twelve slots, "snap-in" drive rails, 8 cooling fans, Dimensions: 20.5" x 16.25" x 23.75" (DxWxH)



KS-1400

■ **CD-ROM Tower Subsystem Chassis**
- 7 Plextor 14/32X PX-32TSI w/250W PS .. $1828
- 7 Plextor 12/20X PX-20TSI w/250W PS .. $1660
- 7 Toshiba 32X XM-6201B w/250W PS $1128
- 7 Toshiba 12X XM-5701B w/250W PS $904

■ **UPS Un-interrupted Power Supply**
- APC SmartUPS SU420NET/SU620NET/SU700NET ..... $249/$316/$379
- APC SmartUPS SU1000NET/SU1400NET ..... $509/$651
- APC SmartUPS SU2200NET/SU3000NET ..... $969/$1735
- Viewsonic Opti UPS w/complete software 280/420/650/1000/1400 .... $112/162/254/358/469

Compatibility Guaranteed
Call for your preferred hardware not listed above

Windows NT 4.0 Server/Workstation

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1035 San Pablo Ave. #1
Albany CA 94706
Ph:510-526-2626
Fax:510-526-0273
CLOSED ON SUNDAY!
Yes! Open on Sunday!

Off I-80 Albany Exit, go toward the hill and turn right on San Pablo Avenue. We are facing U.C. Village. Or off I-80 Gilman St, go toward the hill and make a left turn on San Pablo Ave.

Belmont Store
Ph:415-592-3333
1501 El Camino Real #E
Belmont CA 94002
Ph:415-592-3333
Fax:415-592-2919
CLOSED ON SUNDAY!
Yes! Open on Sunday!

From north or south, Off I-101 Ralston Ave, go towards west, left on El Camino Real and make a U-turn ASAP. We are on your right.

Fremont Main
Ph:510-226-3666
44063 Fremont Blvd.
Fremont CA 94538
Ph:510-226-3666
Fax:510-226-6758
Business Hours:
Mon to Sat 9:00AM-6:00PM
Sunday 10:00AM-5:30PM
Yes! Open on Sunday!

Off I-880 Auto Mall Pkwy East, pass Technology Drive and make a right on Fremont Blvd, (or off 680 Durham, go west, pass Osgood Rd, then make a left on Fremont Blvd.) first driveway on your right.

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A-BIT TX-5 Jumperless 512K TX-chipset Motherboard Pentium 75-200Mhz/Cyrix® 686-200+/AMD K5/K6 DIMM+SIMM supported, 4 PCI+3 ISA slots, onbrd PCI-IDE, HiSpd I/O, FD, Flash BIOS w/ OverClock Setting AT Form $90
A-BIT AX-5, same as above but in ATX Form $95
A-BIT LX-6 Pentium II Jumperless 440LX-chipset Motherboard, 168Pin DIMM, 1AGP+4 PCI+3 ISA slots, onbrd UDMA-IDE, HiSpd I/O, FD, USB, Flash BIOS, Soft-Menu, ATX Form $115
ASUS TX97 Pentium® processor-based board - 430TX PCISet, Pipelined 512K onbrd, 75-200Mhz Pentium/MMX/AMD/Cyrix200+ CPUs, 4 PCI+4 ISA+1 ASUS MediaBus slots, 168Pin DIMMx3 support, onbrd Ultra-IDE, FD, HiSpd I/O, Flash Award BIOS w/NCR SCSI Suppt, AT form factor $142
ASUS TX97-E same as TX97, plus 72PinSIMMx4 support $142
ASUS TX97-X Pentium® processor-based board - 430TX PCISet, Pipelined 512K onbrd, 75-200Mhz Pentium/MMX/AMD/Cyrix200+ CPUs, 4 PCI+4 ISA slots, 168Pin DIMMx3 support, CreativeLabs VIBRA PnP Audio, onbrd Ultra-IDE, FD, HiSpd I/O, USB, Flash Award BIOS w/NCR SCSI Suppt, ATX form factor $165
ASUS TX97-XE same as TX97X, plus 72PinSIMMx4 support $170
ASUS P2L97 Intel Pentium II motherboard - 233-333Mhz support, 440LX AGPset with Accelerated Graphics Port Connector for optimal Video Graphics, 5 PCI/2 ISA/1 AGP slots,DIMM, Onbrd I/O, UltraDMA PCI IDE, ATX format $169
ASUS P2L97-S same as P2L97, plus onbrd Adaptec 7880 U-Wide SCSI $240
ASUS P2L97-DS same as P2L97, plus onbrd Adaptec 7880 U-Wide SCSI and Dual Pentium II CPU support $389
Intel Anchorge AN430TX Pentium MMX motherboard - Yamaha OPL4 hardware wavetable audio, 512K Cache, 430TX chpst, 3 ISA+3 PCI slots, onbrd PCIIDE, FD, I/O, PS/2 connectors, Flash AMI BIOS, 168Pin DIMM support upto 256MB, ATX form factor $155
Intel Atlanta AL440LX Pentium II Motherboard - 233Mhz & above CPU support, 440LX AGPset with Accelerated Graphics Port Connector for optimal Video Graphics, Yamaha OPL4 hardware wavetable audio,3 PCI/2 ISA/1 AGP slots, DIMM, Onbrd I/O, UltraDMA PCI IDE, ATX format $185
Intel Dakota DK440LX Dual Pentium II Motherboard 82440LX AGPset - 233Mhz & above Dual CPU support, 440LX AGPset w/ Accelerated Graphics Port Connnr for Video Graphics,4 DIMM slots,Onbrd I/O,UltraDMA PCI IDE,onbrd Intel Pro10/100BT Ethernet/Adaptec 7895 Dual SCSI w/RAIDport $525
•Intel Providence PR440FX Dual Pentium® Pro processor-based board - Intel 440FX PCISet, support Dual Pentium® Pro CPUs w/VRM, ECC EDO buffered 168Pin DIMM upto 512MB, Integrated LAN Controller Intel 82557 (EtherExpress® Pro/100B), Integrated UWide SCSI Adaptec® 7880 w/onbrd + External mini-68Pin Wide Connector, Integrated Audio - Crystal +Yamaha OPL3 FM Synthesizer 16bit StereoSound, 4 PCI+1 ISA slots, onbrd PCI Bus Master IDE ports,HiSpd I/O, FD, Flash AMI PnP BIOS $300
TYAN Tahoe-A ATX S1684SA Pentium II 233-300 MHz System Board - 4 PCI + 4 ISA Slots, 6 72Pin SIMM for Max 512MB, Integrated Creative Labs Vibra 16 Audio, Onbrd Super IO/FD/IDEs/USBs/PS2, Flash Award BIOS (Also supports Pentium Pro CPU with optional Riser Card) $220
TYAN Tahoe-2 ATX S1682D Dual Pentium II 233-300 MHz System Board - 5 PCI + 3 ISA Slots, 8 72Pin SIMM for Max 512MB, Onbrd Super IO/FD/IDEs/USBs/PS2, Flash Award BIOS $235
Tyan Tiger Single ATX (S1692S) - Pentium II board, 233Mhz & above CPU support, 440LX AGPset with Accelerated Graphics Port Connector for optimal Video Graphics, 3 PCI/2 ISA/1 AGP slots, DIMM, Onbrd I/O, UltraDMAIDE, ATX $175
Tyan Tiger Dual ATX (S1692DL) - Dual PII board, same as Tiger Single $275
Tyan Thunder 2 ATX (S1696DLUA) - Dual Pentium II board w/ 440LX chpst, AGP, Yamaha® OPL3 & OPL4 Wavetable Sound On-board,Adaptec 7895 Dual SCSI w/RAIDport $435
AMI (American Megatrends, Inc) Goliath Quad Pentium® Pro Processor EISA/PCI motherboard - U.S. designed and made 180/200MHz (or higher) 1/2/4 processors supported, easy upgrade thru CPU based board approach, 1GB memory max onboard with 168 pin slots, 4 way interleave for max performance, ECC support, 168Pin DIMM support, 82450GX chpst, AMI Flash BIOS, 6 PCI+4 EISA slots, Integrated I/O w/ 1P/2S/FD/IDE, Full Size AT factor
Above w/ two 200MHz Pentium Pro 256K CPUs $5115
Above w/ four 200MHz Pentium Pro 256K CPUs & 2nd CPU baseboard $7675

CPU & Memory: (Prices Subject to Change without notice)

Intel Pentium® Pro processor 256K/512K 150/180/200Mhz ..... $Call
Intel Pentium® II processor 233MHz/266MHz/300MHz 512K Cache ..... $Call
Pentium® P5-100/120/133/150/166/200/233MHz/MMX CPU ..... $Call
AMD K5/K6/Cyrix®/IBM® 6x86-166+/200+/M2 CPU ..... $Call
256/512K Synchronous Pipelined Cache COAST module ..... $20/$25
72Pin SIMM - 32/36Bit-FP/EDO/Parity ..... $Call
16/32/64MB 168Pin SDRAM DIMM Unbuffered 10ns for TX/440FX/LX ..... $Call
32/64/128MB 168Pin SDRAM DIMM+EPROM/ECC UnBuffered 10ns 440LX .. $Call

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Adaptec 2940U Ultra SCSI/2940UW SCSI Controller ..... $155/$180
Adaptec NEW 2940U2W Ultra2 SCSI PCI Controller ..... $Call
Adaptec AAA-131/AAA-133 RAID 5 Ultra-Wide SCSI-2 Multi-Channel Host Adaptor w/1MB Cache onbrd ..... $360/$680
Diamond Fireport 40 UW-SCSI PCI Controller - 68+50 pin SymBios Chipset .. $175
Diamond Fireport 20 UW-SCSI PCI Controller - 50pin SymBios Chipset $149
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External Wide SCSI Mini-68Pin Adapter with 3-68pin-connector Internal ribbon cable for any onboard internal 68pin Wide SCSI interface $45

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Fast Wide SCSI-2 Internal Ribbon Cable, 68Pin, 2/3 connectors $20/30
External SCSI Cables/Terminator Centronic/Mini/UltraDensity 50/68Pin ..... $Call

Network Card

Ethernet NE2000 ISA PnP/Softset 16Bit Combo/PCI Combo ..... $25/$40
Intel EtherExpress Pro 10/100 PCI ENET 32Bit 10-BT (PILA8465B) $60
3COM Etherlink III 3C509B Combo $70
3COM Etherlink XL 3C900 Parallel-Tasking PCI Combo $78
3COM Fast Etherlink XL 3C905-TX Parallel-Tasking 100BT PCI $65

Video Card

Trident 9685 Windows Accelerator PCI 1MB/2MB with MPEG and AVI Motion Video built-in $30/40
ATI 3D ProTurbo PC2TV SGRAM 4MB/8MB ..... $120/$160
ATI All-In-Wonder 7-in-One TV, Video and Graphic multimedia,PC or TV Display, TV Tuner, w/ ATI's 3D RAGE II and ImpactTV chipset 4MB $205
ATI Xpert@Work AGP/PCI RAGE PRO Chipset SGRAM DVD Acceleration, OpenGL Compliant, 4MB/8MB $150/200
ATI Xpert@Play AGP RAGE PRO Chipset SGRAM DVD Acceleration, TV Out Features, 4MB/8MB $169/225
ATI Xpert@Play PCI RAGE PRO Chipset SGRAM DVD Acceleration, TV Out Features, 4MB/8MB $149/199
Matrox MGA Millennium II WRAM PCI 4MB/8MB ..... $170/$269
Matrox MGA Millennium II WRAM AGP 4MB/8MB ..... $175/$275
Memory module for Millennium II 4MB/8MB/12MB ..... $115/$185/$295
Matrox MGA Mystique 220 2MB/4MB SGRAM OEM $99/125
Diamond VIPER V330 AGP 4MB SGRAM 2D/3D NVIDIA RIVA128 Chpst 128Bit Windows Accelerator Upgradable to DVD $155
Diamond VIPER V330 PCI 4MB SGRAM 2D/3D NVIDIA RIVA128 Chpst 128Bit Windows Accelerator Upgradable to DVD $155
Diamond FIRE GL1000 Pro 4MB/8MB AGP/PCI, SGRAM 2/3DLabs Permedia 2 Graphics Chipset ..... $145/$190

Monitor

14" ShamRock 1Kx768Nlx0.28DP Digital Control Pwr-Saving Monitor $145
15"/17" ShamRock 1280x1KNlx0.28DP Monitor ..... $195/$370
Hitachi NSA SuperScan Pro CM-500U 15" .28DP, 1280x1024 ..... $285
Hitachi NSA SuperScan Pro CM-620U 17" .28DP, 1280x1024 ..... $470
Hitachi NSA SuperScan Pro CM-751MU 19" .22DP, 1600x1200 ..... $985
Hitachi NSA SuperScan Pro CM-800U 21" .22DP, 1600x1200x75Hz $1325
Hitachi NSA SuperScan Elite CM-630U 17" .22DP, 1600x1280x69Hz $569
Hitachi NSA SuperScan Elite CM-802U 21" .22DP, 1600x1280 ..... $1490
Hitachi NSA SuperScan Elite CM-803U 21" .22DP, 1800x1440 77Hz $1540
IIYAMA VisionMaster-17 MF-8617E 17" .26DP, Microprocessor Contrl, PnP, DPMS, MPRII, Full On-screen program, 1600x1200@69Hz $519
IIYAMA VisionMaster-Pro 17 MT-9017E 17" .25DP, Microprocessor Contrl, PnP, DPMS, MPRII, Full On-screen program, 1600x1200@72Hz, Trinitron Tube $610
IIYAMA VisionMaster 450 S-901GT 19" .22x.14DP, 18.0" Diagonal View Size, PnP, DPMS, TCO 95 Compliant, Full On-screen program, Anti-Static & Reflection Coating, 1600x1200@80Hz $780
IIYAMA VisionMaster-Pro 21 MT-9021E 21" (19.5" view) .30x.00DP, Microprocessor Contrl, PnP, DPMS, MPRII, Full On-screen program, 1600x1200@76Hz, Diamondtron $1085
IIYAMA VisionMaster-Pro 500 MT-9221 21" (19.5" view) .28x.00DP, Microprocessor Contrl, PnP, DPMS, MPRII, Full On-screen program, 1800x1440@74Hz, Diamondtron $1285
Sony 15"-100ES/100GS .17"-200ES/200GS/200PS 19"-400PS 21"-500PS ..... $335/$369/$585/$679/$795/$1165/$1665
Viewsonic E641/E655/15GA/15GS/17EA/17GA/17PS/PT770/PT775/GT770/G-800/G810/PT813/G810/GT800/29GA/P810/P815/etc ..... $Call
Mitsubishi, NEC, ADI, Nokia ..... $Call

Modem:

SupraExpress 33.6K Voice Fax internal PnP $59
SupraExpress 56K internal PnP Fax w/SpeakerPhone Voice $99
USR Sportster 33.6K Faxmodem Internal/External ..... $85/$110
USR Sportster 33.6K Voice Faxmodem w/Voice Internal $95
USR Sportster x2-56K Faxmodem Internal/External ..... $135/$190
USR Sportster x2-56K Voice Faxmodem w/Voice Int./Ext ..... $145/$205

Floppy Drive/Tape Backup

Floppy Drive 1.44M 3.5"/Teac 1.2M 5.25"/1.44M 3.5" ..... $24/$45/27
Colorado 3.2GB T-3000 off floppy Travan w/Win95 Sftwre, w/tape $155
Colorado HP T4000S/T4i 8GB, 62MB/min, SCSI-2, Travan TR-4, Int., w/tape .. $359
Colorado HP 5GB, IDE, 648K/s, 55MB/min, 2.5Gb native/5GB compressed, Travan TR-4, Int., w/tape $220
Colorado HP 5GB Travan Tape 1pack/2pack/5pack ..... $39/$60/$135
Seagate 4586NP SCSI-2 DAT DDS-2 Autoloader supports 4 - 120m 4MM DAT tapes for 32GB, optional 12 tape magazine for 96GB $935
Optional 12 tape magazine for above $135
A:Drive LS-120MB Super Hi-Val FDrive 5X1.44FD spd, read/write 1.44MB $140
Iomega ZIP Drive 100MB w/disk ATAPI IDE -Internal $95
Iomega ZIP Drive 100MB w/disk SCSI-Internal/External ..... $125/$145
Iomega ZIP Drive Disks single/three/ten pack ..... $15/$40/$130
Iomega Jaz Drive 1GB w/disk SCSI-Internal/External ..... $275/$365
Iomega Jaz Drive Disks single/five pack ..... $92/$445
Tape Cartridge TR-1/TR-3/TR-4/DAT ..... $32/$35/$45/$Call

KeyBoard/Mice/Software/Chassis/PowerSupply/Misc:

Mitsumi/KeyTronic 104 Enhanced Win95 Keyboard ..... $12/$21
Focus 2001 104 Win95 Key Enhanced Click w/Cover $33
Focus 6002 104 Win95 Key Enhanced w/ wristrest $30
Natural Keyboard SK-6000 Win95 Key Enhanced / with Touch Pad ..... $45/$65
MicroSoft Natural Keyboard Win95 Key (with System Purchase ONLY) $55
MicroSoft Ergonomic Mouse Serial/PS2 (with System Purchase ONLY) $25
MicroSoft Intelli mouse with wheel Serial/PS2 (with System Purchase ONLY) .. $40
Logitech 2-Button Mouse Serial/PS2 ..... $12/$12
Logitech Mouseman Serial+PS 2 Combo/Cordless ..... $25/$60
Logitech Trackman Marble $45
MS DOS 6.22/Windows V3.11/WFWG V3.11(w/System Purchase) $45/55/75
MS Windows 95 Full CD OEM/NT V4.0 Workstation (w/SystemPurchase)$90/$180
MS Windows NT V4.0 Server with 5 User Access License OEM $650
GigiStar Series Full Tower 250W AT/ATX ..... $79/$89
GigiStar Series Medium Tower 250W AT/ATX ..... $60/$70
GigiStar Series Mini Tower/DeskTop AT 230W ..... $40/$45
Server Chassis (T-101)/Disk Array Chassis (T-103): Dimension=13"x31"x22" w/Dual Redundancy & Hot Swappable Power Supplies:
- T-101:12 DriveBays/Upto 2 PowerSupply 2x300W, 2x4.6" Smart Fans w/ Efficient, Air Flow, Full Size AT Motherboard FormFactor $880
- T-103: 16 DriveBays/Upto 2 PowerSupply 2x300W, 2x4.6" Smart Fans w/ Efficient Air Flow, Perfect RAID Disk-Array Sub-Chassis $880

Server Chassis LT-18 By Axxion w/o Power Supply - Full-size AT, Baby AT, oversize AT based boards, 11 drive bays (one 3.5" and four 5.25" exposed, six 5.25" hidden bays), Twelve slots, "snap-in" drive rails, second cooling fans, accepts standard power supply, Dims: 26" x 10" x 24.5" $480
Server Enclosure KS-1400 w/ Dual Redundant Hot-Swappable 300Wx2 PS, Full-size AT, Baby AT, oversize AT based boards,14-5.25" drive bays, Twelve slots, "snap-in" drive rails, 8 cooling fans, Dims: 20.5" x 16.25" x 23.75" (DxWxH) .. $910
Deluxe External SCSI Case w/Terminator+SCSI Cable+P/S+Fan 3.5" Half Height/5.25" Half Height ..... $60/$90
Deluxe External SCSI Case w/68Pin Wide/Ultra Wide SCSI Connector + P/S + Fan 3.5" Half Height with 68Pin External Cable and Terminator $150
Power Supply PS-2 Type 230W/250W/300W ..... $28/$35/$85
Power Supply ATX Type 235W/250W/300W ..... $55/$40/$85
486/P5/P6 CPU Cooling Ball-Bearing Fan w/heat sink ..... $8/$12/$25
Chassis Second Cooling Fan 3" or 3.5" $15
Printer Cable 6"/10"/15"/25" $5/7/10/16
PS/2 mouse port connector for motherboard PS/2 mouse port $10

CD-ROM Drive

Toshiba XM-6202B 32X Speed Internal ATAPI IDE CD ROM $90
Toshiba XM-6102B 24X Speed Internal ATAPI IDE CD ROM $69
Mitsumi 24X VariableSpeed Internal ATAPI IDE CD-ROM $66
Mitsumi FX162T 16X Speed Internal ATAPI IDE CD-ROM $57
Toshiba XM-5701 12X Speed Internal SCSI CD ROM $87
Toshiba XM-6201B 32X Speed Internal SCSI CD ROM $119
Plextor 20-Plex 12/20XSpeed, 1800-3000Kb/sec, Fast SCSI2, 95ms seek, 512K Buffer, SCAM, w/Tray, PX-20TSI Internal $195
Plextor UltraPlex 14/32XSpeed, 2100-4800Kb/sec, Fast SCSI2, 95ms seek, 512K Buffer, SCAM, w/Tray, PX-32TSI Internal $219
DVD/CD Writer/RE-Writer Internal/External ..... $Call

Sound Card/Speaker/MultiMedia Package

Yamaha, Altec, Lansing Speakers ..... $Call
60W/80W/120W Hi-Fi Amplified Stereo Speakers $15/30/55
Yamaha 3D Stereo Sound Card w/ Wavetable, Full Duplex, 16Bit $25
Sound Blaster 16 PnP OEM $50
Sound Blaster AWE64 PnP Value OEM $70
Sound Blaster AWE64 GOLD PnP w/ IDE Interface Retail $169
Audio Cable - CD-ROM to Sound Card $3

HardDisk

Western Digital - Caviar

2.1GB IDE WDAC12100 - UltraDMA 33.3Mb/s 256KB 9.5ms 5400RPM $155
3.2GB IDE WDAC23200 - UltraDMA 33.3Mb/s 256KB 9.5ms 5400RPM $184
4.3GB IDE WDAC24300 - UltraDMA 33.3Mb/s 256KB 9.5ms 5400RPM $215
5.1GB IDE WDAC35100 - UltraDMA 33.3Mb/s 256KB 11ms 5400RPM $249
6.4GB IDE WDAC36400 - UltraDMA 33.3Mb/s 256KB 9.5ms 5400RPM $279
2.1GB Ultra SCSI-2 Enterprise E2170-3 512KB 7200RPM $357
2.1GB UltraWide SCSI-2 Enterprise E2170-7 512KB 7200RPM $369
4.3GB Ultra SCSI-2 Enterprise E4360-3 512KB 7200RPM $550
4.3GB UltraWide SCSI-2 Enterprise E4360-7 512KB 7200RPM $575
9.1GB Ultra SCSI-2 Enterprise E9100-3 512KB 7200RPM ..... $Call
9.1GB UltraWide SCSI-2 Enterprise E9100-7 512KB 7200RPM ..... $Call

Quantum

2.1GB FireBall SE32100A EIDE UltraDMA 9.5ms, 5400RPM $155
3.2GB FireBall SE33200A EIDE UltraDMA 9.5ms, 5400RPM $175
4.3GB FireBall SE34300A EIDE UltraDMA 9.5ms, 5400RPM $195
6.5GB FireBall SE36400A EIDE UltraDMA 9.5ms, 5400RPM $275
8.4GB FireBall SE38400A EIDE UltraDMA 9.5ms, 5400RPM $365
2.1GB FireBall SE32100S Ultra-SCSI 9.5ms, 5400RPM $215
3.2GB FireBall SE33200S Ultra-SCSI 9.5ms, 5400RPM $250
4.3GB FireBall SE34300S Ultra-SCSI 9.5ms, 5400RPM $285
6.5GB FireBall SE36400S Ultra-SCSI 9.5ms, 5400RPM $310
8.4GB FireBall SE38400S Ultra-SCSI 9.5ms, 5400RPM $455
4.5GB Viking VK34550W Ultra Wide SCSI-2, 8ms, 7200RPM $445
9•.1GB Atlas AL39120W Ultra Wide SCSI-2, 8ms, 7200RPM $825

Seagate

4.55GB Barracuda 4LP ST34572N Ultra SCSI-2 50pin 7200RPM, 512K $545
4.55GB Barracuda 4LP ST34572W Ultra Wide SCSI-2 68pin 7200RPM, 512K .. $565
9.1GB Barracuda9 ST19171N Ultra SCSI-2 50pin 7200RPM, 512K $795
9.1GB Barracuda9 ST19171W Ultra Wide SCSI 68pin 7200RPM, 512K $825
4.55GB Cheetah AV ST34501N Ultra SCSI-2 8.5MS,10000RPM $625
4.55GB Cheetah AV ST34501W UltraWide SCSI 68pin 7.5MS,10000RPM $655
9.1GB Cheetah AV ST19101N Ultra SCSI-2 7.5MS,10000RPM $1035
9.1GB Cheetah AV ST19101W UltraWide SCSI 7.5MS,10000RPM $1065
23GB Elite ST423451N Ultra SCSI-2 5400RPM ..... $1[illegible]25
23GB Elite ST423451W UltraWide SCSI 5400RPM ..... $1[illegible]

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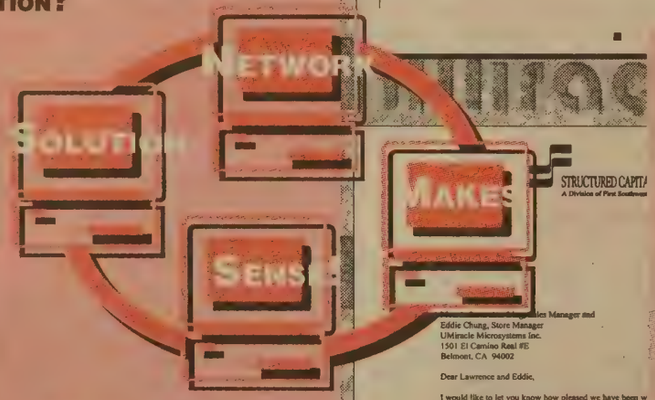
- Power and Data Protection
- User/Administrator Training
- Expertise Technical Support
- Maintainence Contract

MIS GUYS, WE KNOW YOU ARE TIRED! YOUR COMPANY DEPENDS ON YOUR NETWORK AND YOUR NETWORK DEPENDS ON YOU! YOU ARE PAYING YOUR CONSULTANT TO EXPERIMENT WITH YOUR HARDWARE! YOUR HARDWARE PROVIDER IS CLAIMING YOUR PROBLEM IS SOFTWARE RELATED BUT YOUR SOFTWARE VENDOR SAYS IT IS NOT! AND YOUR BOSS IS PULLING YOUR HAIR!

YOU THOUGHT IT WAS EASY? WISH YOU HAVE KNOWN THE COMPATIBILITY PROBLEM FOR YOUR NON-RETURNABLE PURCHASE? WISH YOUR CONSULTANT HAVE KNOWN IT ALL?

DON'T YOU KNOW CONSULTANTS COME TO UMIRACLE WHEN THEY NEED HELP? DON'T YOU KNOW YOU CAN SAVE MONEY BY SKIPPING YOUR VAR? DON'T YOU KNOW YOU CAN SIT BACK AND RELAX IF UMIRACLE PROVIDES YOU A COMPLETE, HASSLE-FREE VERTICAL SOLUTION?



5 + Peer2Peer Network Solution

- FIVE ASUS TX97 AMD-K6 200MHz WorkStations w/Licensed Windows 95
  (See Previous Pages for Workstation Configuration Details)
- FIVE Intel EtherExpress 100BaseT PCI Network Interface Adapters Installed
- Up to 500' Catalog-5 100BaseT UTP Cabling (InWall w/ Plates - 5 Nodes)
- 10BaseT 8-Port Hub
- HP LaserJet 5 Printer
- OnSite Windows 95 Peer to Peer Network Resources and Printer Setup

Recommended Options:
- 100BaseT 8-Port Hub
- Internet Access + EMail Solution
- Network User + Administrator Training
- 3 Month 8-Hour Response Service Maintainence Contract

$6864 or Equipment BusinessLease* For As Low As $190.62 Per Month 48 Months

10 + ONE Network Solution

- TEN ASUS TX97 AMD-K6 200MHz WorkStations w/Licensed Windows 95
- ONE ASUS P2L97 Pentium II 266MHz AGP File Server w/25 User Licensed NT4.0 Server
  (See Previous Pages for Workstations and Server Configuration Details)
- ELEVEN Intel EtherExpress 100BaseT PCI Network Interface Adapters Installed
- HP LaserJet 5N WorkGroup Printer w/10BaseT Connection to Server
- 3COM 3C250B-TX 12-Port 100BaseT Stackable Hub
- APC Smart-UPS SU420Net Un-interruptable Power Supply w/ Setup
- Up to 1100' Catalog5 100BaseT UTP Cabling (InWall w/ Plates - 11 Nodes)
- OnSite Windows NT WorkGroup Network Resources and Printer Setup

Recommended Options:
- Internet Acces + EMail Solution
- 3 KeyStroke Recovery Backup Solution
- Fax Server Solution
- Network User + Administrator Training
- 6 Month 8-Hour Response Service Maintainence Contract

$17131 or Equipment BusinessLease* For As Low As $476.23 Per Month 48 Months

20 + ONE Network Solution

- TWENTY Intel Anchorage w/Audio Pentium 200MMX WorkStations w/Licensed Windows 95
- ONE Intel Dakota DK440LX Pentium II File Server w/ Single 266MHz CPU w/25 User Licensed NT4.0 Server with Dual 100BaseT PCI NICs each connected to 100BaseT hub for double thoroughput
  (See Previous Pages for Workstations and Server Configuration Details)
- TWENTY-TWO Intel EtherExpress 100BaseT PCL Network Interface Adapters Installed
- ONE HP LaserJet 5M WorkGroup Printer w/10BaseT Connection to Server
- TWO 3COM 3C250B-TX 12-Port 100BaseT Stackable Hub
- APC Smart-UPS SU620Net Un-interruptable Power Supply w/ Setup
- Up to 2100' Cat5 100BaseT UTP Cabling (InWall w/ Plates - 21 Nodes)
- OnSite Windows NT WorkGroup Network Printer and Resources Setup

Recommended Options:
- Internet Acces + EMail Solution
- 3 KeyStroke Recovery Backup Solution
- Fax Server Solution
- Network User + Administrator Training
- 6 Month 8-Hour Response Service Maintainence Contract

$38490 or Equipment BusinessLease* For As Low As $1066.17 Per Month 48 Months

40 + ONE Network Solution

- FORTY Intel Anchorage w/Audio Pentium 200MMX WorkStations w/Licensed Windows 95
- One TYAN Thunder 2 Dual Pentium II 300MHz File Server w/45 User Licensed NT4.0 Server with Adaptec ANA-6940 Quad 100BaseT Port PCI Adapter for quadruple thoroughput
  (See Previous Pages for Workstations and Server Configuration Details)
- FORTY Intel EtherExpress 100BaseT PCI Network Interface Adapters Installed
- ONE HP LaserJet 5SiMX Departmental Printer w/10BaseT Connection to Server
- FOUR 3COM 3C250 12-Port 100BaseT Stackable Hubs
- APC Smart-UPS SU1000Net Un-interruptable Power Supply w/ Setup
- Up to 4100' Catalog5 100BaseT UTP Cabling (InWall w/ Plates - 41 Nodes plus Wiring Rack)
- OnSite Windows NT WorkGroup Network Printer & Resources Setup

Recommended Options:
- Internet Acces + EMail Solution
- 3 KeyStroke Recovery Backup Solution
- Fax Server Solution
- Network User + Administrator Training
- 12 Month 8-Hour Response Service Maintainence Contract

$96358 or Equipment BusinessLease* For As Low As $2621.81 Per Month 48 Months

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Don't wait in line for your turn to fax, Don't hand-write your cover page! Fax directly from your desktop, neatly and professionally! With the right Fax Solution, you can receive your fax and print right to your laser printer, reprint your 6 months old fax, fax your documents from your windows application just like printing. All via one line, one modem! Forget about bringng a line and a modem to every desktop! With WinFax Pro For Networks (Non-delicated) and SatisFAXtion Faxboard, and UMiracle Network Solution technical expertise, We sure can get you the best solution! Call us for details!

3-KeyStroke Recovery Backup Solution

You think you got it all backed up? Not until the day your server crashes you will find out you have to 1.) troubleshoot and replace your defective components, 2.) reload your NOS, drivers, appications and backup software, 3.)restore your data files from backup, 4.)reconstruct your user and printer accounts, and 5.)expect missing and corrupted data here and there! Why? Because your backup software backs up only data files, not the opened files, not the security database or partition information! BACKUP SOFTWARE DON'T MAKE SENSE UNTIL NOW! With Replica V3 by STAC, you can backup your harddrive partitions as objects, rescue your disaster with 3 keystrokes from a recovery disk, even from a low-level-formated harddrive, and bring your server up in hours! To find out how we can provide this solution, Call us Now!

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Phone: 510-226-3666 Fax: 510-226-6758

* Equipment Business Lease applies to equipment, cabling & setup labor altogether. Lease payment is based on $1 Purchase Purchase Option. One Time $75 documentation fee are required. Two advanced payments required if approved. Taxes are not yet included.

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but there are major technological hurdles in the way of doing so.

On the other hand, practically anyone with a computer, a modem, and a keen enough interest could swipe your data or intercept your email. And even someone without any of those can see everything on your hard drive if they just steal your computer. It happens all the time.

So, should you be encrypting your personal mail and files? Assuming you answered yes, read on to find out where to get PGP for the Mac and how to install and use it.

Using PGP

To get PGP, simply point your browser to *(http://www.pgp.com:8001/freeware/PGPfreeware553.hqx)*. There you will have to fill out a form declaring that you are in the US and promising not to forward the program to anyone outside the US.

Once the installer is downloaded on to your hard drive, double-click on it. Carefully read all the terms of use and the ReadMe (just kidding!) and then install the software.

Restart your computer. You will find a PGP 5.5 folder on your hard drive. In addition, the installer will also place a few extensions in your system folder. If you use Emailer or Eudora, you will find that you can now encrypt and decrypt files from within these programs. PGP is better integrated with Emailer, but works just fine with both products.

Using the PGPkeys application, you can instruct PGP to place an icon in the menu bar of specific programs so that you can access PGP encryption from any program you choose.

Encrypting, decrypting, and signing with PGP are pretty straightforward. Understanding how it all works can be a little tricky. PGP 5.5.3 comes with a manual in PDF format, but even better than that, it now supports AppleGuide. Take few minutes and read through the AppleGuide files. It is well worth the effort.

Once you are ready, create a key for yourself. All of PGP's functions are available through the PGPkeys program. You might also want to take a minute or two to check out the various preferences available under the Edit pulldown menu. I strongly recommend that you check the box that says, "Always encrypt to default key." The default key is the one that you create for yourself. This will allow you to always decrypt any mail that you send to anyone. Remember: you encrypt email with the public key of the intended recipient(s). Anyone whose public key is not included at the time of encryption (including you!) will not be able to decrypt an encrypted message.

Never tell anyone your private key. This is the only protection you have in the world of encryption. And considering that PGP allows you to digitally sign email (proving that it came from you and has not been altered since you sent it), it is important that you never share your private key with anyone.

But how do you get other people's keys? Easy—they can mail them to you as text. Simply drag your key from the PGPkeys window into any application that supports drag and drop. Or, you can use your PGPkeys application to do a search on a Key Server. You can search by name or email address. Feel free to get my key by searching on the Key Server for *"pbl@lindegroup.com"*. I will happily reply to any encrypted email with an encrypted response. Make sure you send your key to the Key Server. Without it, I won't be able to reply in an encrypted form.

PGP is so well-designed that it is easy and actually fun to encrypt and decrypt messages. Give it a try. Protect your privacy. ■

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RESOURCES:

PGP: Pretty Good Privacy
By Simson Garfinkel
O'Reilly and Associates
1-800-889-8969 (US/Canada credit card orders)
1-800-998-9938 (US/Canada inquiries)
or (707)829-0515 (local/overseas).
URL: *http://www.ora.com/catalog/pgp/*

PGP Link Page:
URL: *http://www.pgp.com/service/links.cgi*

What Is BMUG?

BMUG is an educational non-profit computer user group providing know-how, software, and opportunities for 10,000 computer users from countries around the world. We are in the business of giving away information.

BMUG publishes and distributes some of the best computer books and CD-ROMs available. Our semi-annual 400-page "Newsletter," sent to every member, contains scores of articles on every facet of Macintosh computing, the Internet, and more, plus hundreds of megabytes of useful software on the included CD-ROM, all without a single advertisement. Our three BBSes are thriving virtual communities where thousands of people share information about everything from how to defragment a hard drive to how good the latest Emma Thompson movie is, all presented through the friendly FirstClass user interface.

The BBSes also offer access to much of our constantly updated software library. BMUG offers volunteers a broad range of opportunities to learn valuable skills while helping people and having fun. We support over a dozen free Special Interest Groups aimed at everyone from complete beginners to professional programmers, where any member of the public can come to get questions answered. Members can make appointments with our valiant volunteer hardware gurus to get memory installed or mysterious problems examined.

You can learn more about us on our Web page at *http://www.bmug.org* , where you'll find schedules, maps, our guide to the best products for MacOS and general computing, and software and instructions you can use to take a free tour of our Planet BMUG and BMUG Boston BBSes, available by direct dial or over the Internet. Our office at 2055 Center St. in downtown Berkeley is open from 9 am to 5 pm. Come say hello there or at one of our meetings: weekly on the UC Berkeley campus and monthly in San Francisco and San Jose. For more information, call the announcement line at (510)549-2684, ext. 8. You can also fax us at (510)849-9026 or write us at 1442A Walnut St. #62, Berkeley, CA 94709-1496. Join us!

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•ACTNET
1289 21st Ave., San Francisco
(X Street: Irving)

•CENTRAL COMPUTER
835-837 Howard St.
San Francisco
(X Street: 4th St.)

•COMART
444 6th St.
San Francisco
(X Street: Bryant)

•COMPU DATA
22 Third St.
San Francisco
(X Street: Market)

•DATACOM SYSTEMS
245 Kearny St.
San Francisco
(X Street: Sutter)

•HD COMPUTER
232 Montgomery St.
San Francisco
(X Street: Bush)

•HI-TECH USA
850 Taraval St.
San Francisco
(X Street: 19th St.)

•ITS CD
514 Frederick St., San Francisco
(X Street: Stanyan)

•KONICOM COMPUTERS
1443B Noriega St.
San Francisco
(X Street: 22nd St.)

•LAPTOP SUPERSTORE
250 Bush St., San Francisco
(X Street: Sansome)

•SOFTWARE CENTER PLUS HARDWARE
501 Howard St., San Francisco
(X Street: 1st Street)

•STAR LITE ELECTRONICS
2121 Taraval St.
San Francisco
(X Street: 31st)

MARIN

•BCSA COMPUTERS
385 Bel Marin Keys, Novato
(X Street: Gali)

•DATACOM SYSTEMS
888 4th St., San Rafael
(X Street: Lootens Place)

•HIQ SYSTEMS
850 Sir Francis Drake Blvd.
San Anselmo
(X Street: 4th St.)

PENINSULA

•BEST INTERNET COMMUNICATIONS
421 Castro St., Mountain View
(4 blocks east of El Camino)

•CALIFORNIA REPROGRAPHICS
1633 Laurel St., San Carlos
(X Street: St. Francis)

•CBM COMPUTERS
117 W. 25th Ave., San Mateo
(X Street: west off El Camino)

•COMPU 11
643 El Camino Real, S. San Francisco
(X Street: Ponderosa)

•CYPRESS COMPUTER
1035 E. Hillsdale Blvd., Ste. 112
Foster City

•DISK DRIVE DEPOT
914 W. El Camino Real
Mountain View
(X Street: Arques)

•EGGHEAD SOFTWARE
2499 El Camino Real, San Mateo
(X Street: 25th Ave.)

•FRIENDLY SOFTWARE STORE
376 El Camino Real, San Carlos
(X Street: Holly)

•HI-TECH USA
111 E. 5th Ave., San Mateo
(X Street: S. San Mateo)

•HI-TECH USA
441 El Camino Real, Menlo Park
(X Street: Middle Ave.)

•IBI COMPUTERS
551 Foster City Blvd., Suite N
Foster City
(X Street: Hillsdale)

•T-ZONE
2240 Bridgepoint Parkway
(Fashion Island Plaza)

•IQ INFOQUEST
4500 El Camino Real, Los Altos
(X Street: San Antonio)

•LAITRON COMPUTER
39 El Camino Real, Millbrae
(X Street: Millbrae Ave.)

•NOVA HARDWARE
1688 Gilberth, Burlingame
(X Street: Malcolm)

•STARLITE ELECTRONICS
1161 Chess Dr., Suite D
Foster City
(X Street: Foster City Blvd.)

•UMIRACLE MICROSYSTEMS
1501 El Camino Real #E, Belmont
(X Street: Habor)

•W & K
132 Hazelwood Dr.
S. San Francisco
(X Street: El Camino Real)

SOUTH BAY—WEST

•AMERICAN COMPUTER RESEARCH
1001 S. DeAnza Blvd., San Jose
(X Street: Bollinger)

•AROMA COMPUTER
470 Lakeside Dr., Sunnyvale
(X Street: Oakmead)

•CENTRAL COMPUTER
3777 Stevens Creek Blvd.,Santa Clara
(X Street: Saratoga)

•CUPERTINO COMPUTER
10675 S. De Anza Blvd.,Cupertino
(X Street: Bollinger)

•DISK DRIVE DEPOT
500 Lawrence Exp., Sunnyvale
(X Street: Arques)

•HALTED SPECIALTIES
3500 Ryder St., Santa Clara
(X Street: Central Exp.)

•HD COMPUTER
988 Walsh Ave., Santa Clara
(X Street: Lafayette)

•HIQ COMPUTERS
740 N. Mary Ave., Sunnyvale
(X Street: Maude)

•HI-TECH USA
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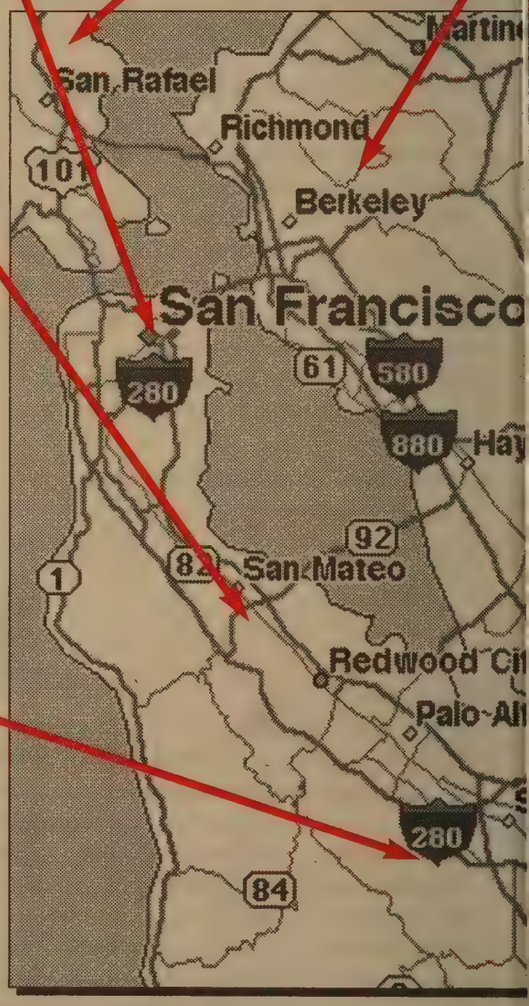

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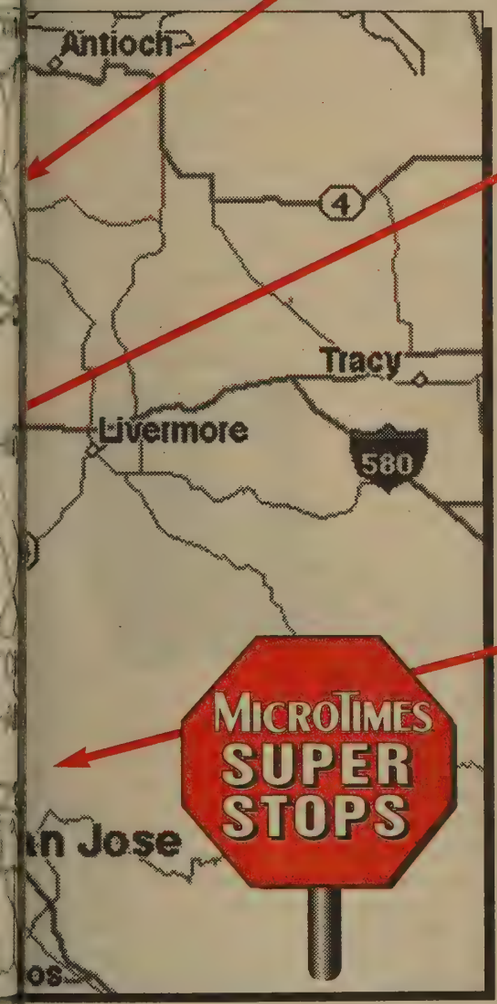

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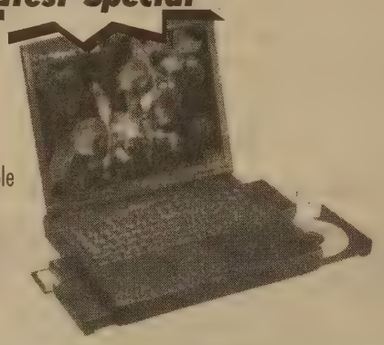

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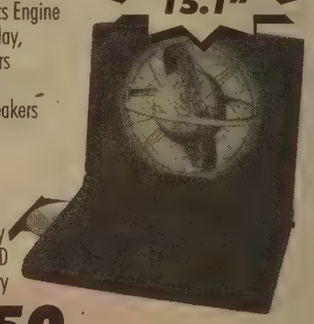

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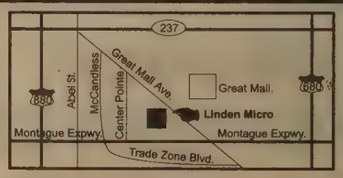

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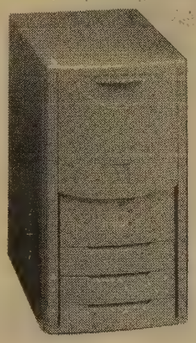

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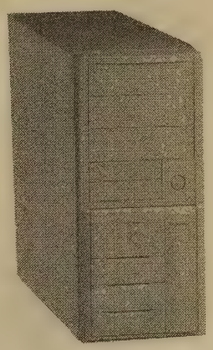

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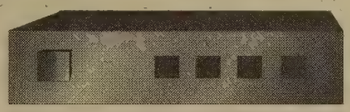

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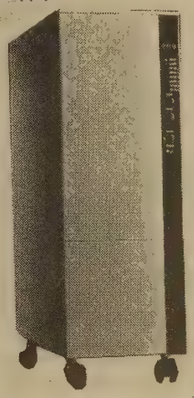

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Is The Internet A Commons?

Second Of Two Parts

Finally to the question: Is the Internet a commons?

The most basic characteristic of a commons is that it is of fixed size, and, therefore, exhaustible. It is a field of grass, or a mine of copper, or some other natural resource in the traditional economic or Marxist sense.

The Internet has been doubling in size every year since 1988. That's approximately 100% growth every year for nine years. Compare that to current worldwide human population growth of about 1.4% per year. If the Internet is a commons, it surely should be barrelling head-on into a tragedy.

This point is important. Many people see "100% growth rate" and think of absurd sales projections they have seen in advertisements. But this 100% growth rate is not a projection. It is based on solid historical figures, collected systematically over years. It is real. We can quibble about whether it's 80% or 120%, and certainly it differs from country to country. But overall the historical Internet growth rate *(http://www.mids.org/internet/growth/)* has been approximately 100% worldwide since 1988. Not 5%, not 10%, not 50%: 100%. This is a sustained growth rate unmatched by any other technological mechanism in the history of the world, so far as I am aware (I am actively searching for similar systems, and I solicit examples).

Broadcast radio or TV could be considered a commons, because they use limited numbers of channels. But the Internet does not have channels in this sense. It is true that Internet Protocol (IP) addresses are limited, consisting as they do of only 32 bits. However, a technical solution has been specified and standardized for years, with usable implementations. That solution, called IP version 6 (IPV6) or IP Next Generation (IPNG), is not yet widely deployed because so far it hasn't been needed, even though the Internet has been doubling in size every year since 1988. It hasn't been needed partly because of conservation, in that IP addresses are allocated in a much more efficient manner these days than they were when IPNG was being designed.

> Why do people want to regulate the Internet? Because, many say, it's a commons, and if use of it is not regulated, access will be inequitable, and those who do have access will destroy it by overuse, like cows overgrazing a field of grass. This opinion has appeared in print in very respectable places.

Perhaps even more relevant is recycling. The average intranet (internal corporate internet) these days uses one of a small number of IP network addresses reserved for that purpose. An unlimited number of companies or other organizations can use the same such IP address simultaneously, with no ill effects whatever on any of those organizations or on the Internet. No matter how many organizations use the same IP address for that purpose, they can never use it up, no more than they can use up the number nine.

Here we have a basic difference between the Internet and Hardin's commons. Some of the most basic Internet resources are inexhaustible. Not because ongoing technical fixes are required to keep increasing the amount of resource available, but because they really are inexhaustible, in the same sense as the number nine or the word yes.

Other Internet resources can be exhausted, at least in the near term. If every Internet user right now decided to reload a Web page all at the same time, many Internet links would be saturated; all their bandwidth would be used up. But this is still not like Hardin's commons. A few moments later, all that bandwidth is free again; as if the grass sprang back up as soon as the cows stopped eating.

Nonetheless, the total number of Internet users is rapidly increasing, and thus they use more bandwidth. Will all the Internet's bandwidth be used up, like grass grazed to exhaustion? No.

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Using the Internet doesn't make it wilt. You can't use up bits, anymore than you can read up the words in a book. You can use up a book, for sure, and you can eventually wear out an Internet router. But you can't use up the bits or the words. And passing more data through an IP link doesn't produce the kind of wear that happens when you roll a wheel or use some other mechanical machine, nor the kind of consumption that happens when you eat a plant.

Using the Internet makes it grow. Each new user comes with a batch of money that that user pays to an ISP (or perhaps pays more indirectly in the case of universities). That ISP uses the money it receives from its users to add more modems, routers, and external bandwidth. It also uses the new money and users to attract more capital from banks, private investors, and the stock market.

There are of course secondary costs, in that Internet links require computers and metal or fiber optic communications links, which require mining, manufacturing, distribution, etc. But the total physical and economic resources required to support the current Internet, or for that matter a future Internet large enough for every person on the planet to be a user, are small compared to, for example, the resources already being used to feed all the people on the planet.

I could be wrong about that. If someone seriously wants to argue that the Internet is a commons in some sense (rather than simply baldly asserting that it is without any supporting arguments or evidence), secondary costs would be a good place to start. Bandwidth is not a good place to start, because bandwidth simply is not analogous to grass.

Furthermore, the resources used to actually transfer information through the Internet are certainly less than for almost any other communications medium. You don't have to chop down trees to make more bits.

The Internet is not a commons. Pretending it is would only lead to bad political and economic decisions. Let's see the Internet for what it is: a communications mechanism, of a new kind, without many of the restrictions that apply to previous communications mechanisms such as books, magazines, radio, and television, and not comparable to a field of grass.

Political Implications

Economics always has political implications, and Hardin is well aware of that. He asserts: "Freedom in a commons brings ruin to all." That may or may not be so; we will not argue it here.

But freedom on the Internet brings growth of the Internet; both in number of users, nodes, and links, and in the information available on it and in the organization of that information.

Viewing the Internet as a commons leads to recommendations of volume charging to limit bandwidth usage (that is precisely what *Science*

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recommends). But with limited bandwidth usage only three years ago we would not have seen the explosive growth in usage of the World Wide Web (WWW) that did occur. WWW is exactly the application that attracted so many new users to the Internet that there are now approximately eight times as many people using it as there were in 1994. (Not 8%: eight times, or 900%.) Few people would have been willing to use the Web if they had been required to incur hefty costs each time they transferred a large graphic. If there had been charges for short-term volume usage before that, we would not have had Gopher (the predecessor of WWW), anonymous FTP (the longstanding mainstay for transfer of large files), or for that matter electronic mail (the most basic Internet application).

Short-term volume charging is short-sighted, and omits the long view that liberal use of bandwidth is exactly what has led to the growth of the Internet.

Similarly, viewing the Internet as a commons leads to the view that content distributed over the Internet must be regulated so that good content will not be inundated with bad. But the Internet does not have limited channels like radio or TV. Content regulation for that reason is not valid. Content regulation by Internet carriers for the protection of minors is also not valid. Such protection belongs on the receiving end, as we and many others, including the US Supreme Court, have discussed at length *(http://www.mids.org/mn/707/cda.html)*. As the Supreme Court Justices put it: "the Internet is 'a unique and wholly new medium of worldwide human communication.'"

This does not mean that there is no need for restraints on bandwidth usage. However, such restraints already exist, in the form of volume charging of larger granularity, such as hourly usage charges and monthly aggregate bandwidth usage charges.

More importantly, they exist in the form of technical mechanisms such as the Van Jacobson TCP slow-start algorithm. In

No one would be foolish enough to say the Internet ended the Cold War and thus improved national security in a nuclear world, yet it did have a role in that historical process.

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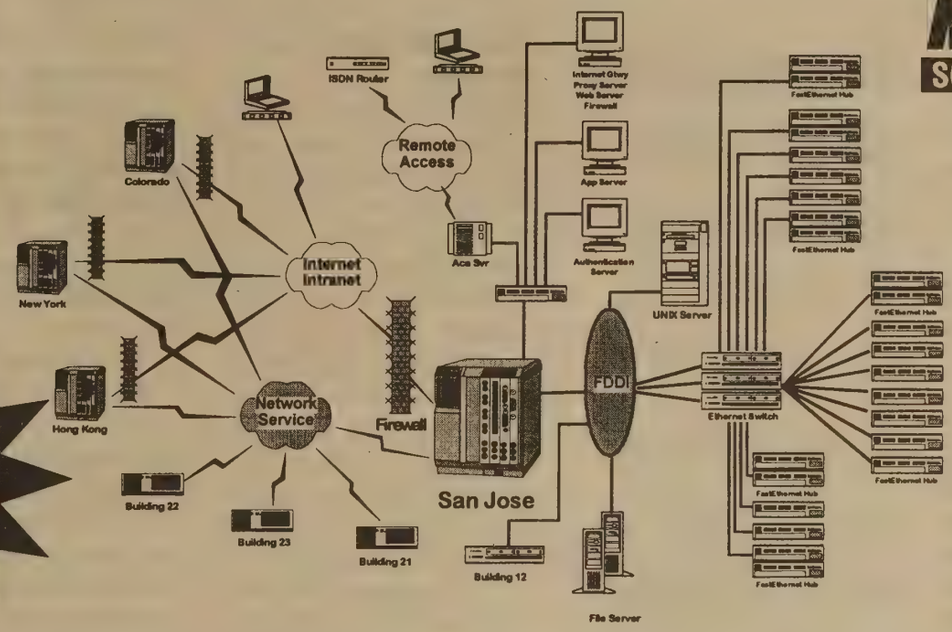

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Hardin's day, the only way to "legislate temperance," as he put it, was to appoint bureaucracies of people to make case-by-case decisions. In our day, we can write computer programs to implement algorithms for technical temperance decisions. Now it is well known in the Internet technical community that Jacobson slow-start was designed before the popularity of the Web, and that it doesn't deal as well as we might like with the Web's propensity for lots of brief TCP connections. But tuning that algorithm makes a lot more sense than appointing bandwidth bureaucracies for the Internet. Internet bandwidth usage really is a technical and economic problem, not a political one.

There are also pathological cases. Spammers abuse the electronic mail mechanisms of the Internet to steal resources from others by sending huge amounts of bulk mail for no gain to anyone but themselves. We should stop them for the same reasons that we should stop bank robbers. Whether we should stop them by the same *means* that we stop bank robbers is a different discussion that I have already treated in several columns. But spammers are clearly a small minority of Internet users; if they weren't, nobody would be able to use electronic mail for any useful purpose. There is no point in extrapolating from spammers to the Internet population at large.

As we have already seen (in the cases of the Soviet coup and the Tienanmen Square massacre), the Internet promotes freedom. Restricting the free flow of information on the Internet would be bad for the Internet and bad for the world at large.

The Internet is not a commons. Freedom may or may not be good for a commons. Freedom *is* good for the Internet.

The total physical and economic resources required to support the current Internet, or for that matter a future Internet large enough for every person on the planet to be a user, are small compared to, for example, the resources already being used to feed all the people on the planet.

The Internet And Wealth

Internet deployment in Internet hosts per capita correlates very strongly with personal income per country (see MMQ 401 at *http://www.mids.org/mmq/401/*). We don't yet know whether this is simply because rich countries can afford more Internet, or, as also seems likely, the Internet promotes economic growth. If the latter is true, consider also that wealth is one of the few things that appears to lead to reduced population growth.

Hardin asserted that "there is no prosperous population in the world today that has, and has had for some time, a growth rate of zero." When he wrote that, it was true. But things have changed. According to the *CIA World Factbook* for 1996, Finland, which is a prosperous country by anyone's measure—not to mention the country with the most Internet hosts per capita in the world—has a 0.1% population growth rate. Even Italy has only a 0.13% growth rate. Those are not zero, but close to it. According to the US Census Bureau's *World Population Profile: 1996*, the populations of Germany and Spain, as well as thirteen other countries that were in the former Soviet sphere, are actually declining, that is, less than zero. Even the aggregate worldwide population growth rate was only 1.4% in 1996, according to the Census Bureau—the lowest rate in more than 50 years. Today's world is not exactly the world Hardin was describing, which is not surprising, 30 years later. Neither Hardin nor Malthus claimed to predict numerically accurate characteristics of the world 30 or 300 years in the future, although it would have been better for their theories if they could have done so.

More importantly for the Internet, there is a clear correlation between human population growth rate and wealth (usually less than 1% annual population growth) and poverty (usually more than 1%).

So if it is true that the Internet promotes economic growth, and if it is true that economic growth leads to lessened population growth, then it would be short-sighted indeed to throttle the Internet, since the Internet could well be contributing to an eventual solution to any impending Malthusian crisis.

Conclusion

Cattle may need culling. Internet users do not.

Freedom may be bad for a commons. Freedom is good for the Internet.

The Internet is not a commons. Let's not treat it as one.

Acknowledgment

This column is dedicated to Dr. Elsie Quarterman, professor emeritus of plant ecology, Vanderbilt University. Any errors in this column are the sole responsibility of the author. ■

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Modem Wars A Side Issue

Telcos And Cablecos Call the Real Shots

High-speed modems. Cool. Just remember you need a phone line or licensed frequency on which to transmit your data.

That said, consumers can now breathe a short sigh of relief as the smoke clears from the most recent intergalactic war over 56K modem standards.

These 56K, cable, and DSL modem wars are quick make-a-buck, three-card monte schemes to squeeze every last dime out of decades-old technology and antiquated telco pricing schemes. The real action is run by the telcos, and to a lesser extent the cable companies.

Not Rockwell. Not 3Com. Not Microsoft. Not yet.

As reported earlier *(http://www.microtimes.com/163/online.html)*, over the past year two competing standards for high-speed modems were touted by rival camps in U.S. Robotics' (x2) and Rockwell's (K56flex) technologies. These competing technologies enabled modems using one pair of regular telephone wires to, in most cases, achieve upwards of 56Kbps downloads and somewhere between 33-40Kbps uploads, depending on the weather and the state of your internal wiring.

Since the introduction of these two standards, each camp—with 3Com swallowing U.S. Robotics in the meantime—claimed that its standard was being implemented faster and by more important people than the other. This war of words was heightened by the fact that a modem built on one standard couldn't talk to a modem built on the other technology.

Despite claims from both camps that buyers would get a free upgrade to some future joint standard, consumers got caught holding the bag of trying to figure out which modem to buy according to which Internet Service Provider (ISP) or online service they used. Pity the technologically Amish who mistakenly chose x2 modems only to change their ISP two months later (not uncommon) only to learn that new ISP supported K56flex technology.

Faced with this Damoclean sword, consumers did the only rational thing. They stopped buying 56K modems in droves. This forced the major players to finally get together in Orlando, FL, at the beginning of December to hammer out a consensus that will produce one ITU standard to be voted on in January and then ratified by September, 1998.

Even in their respective press announcements touting their support for the new consensus, both camps continue skirmishing as if they hadn't heard the armistice had been signed. As we noted last time, these guys do have fun with numbers that goes way beyond apples and oranges. For instance, Brand X claims its modem technology had been adopted and deployed by more than "1,200 ISPs worldwide... offered by nine out of the top 10 ISPs... 100 ISPs in Europe, 30 Latin American ISPs, and 70 ISPs in Asia and the Pacific." Meanwhile Brand Y claims it is the most widely supported 56Kbps technology, "deployed by more than 1,000 ISPs at 6,000 points of presence in 4,000 cities and more than 30 countries worldwide." Can you tell which is which?

What do I care? Just give me something that will work with everything else. I suppose these gadgets will be available sometime late in 2Q '98 as modem manufacturers will offer new "standards-based" modems and upgrades based on the now "determined" standard prior to its actual ratification in September. So you can look forward to another round of "We did it first!" before the whole thing is over.

Then it's on to the been-there done-that next thing.

Cable Wars

Which, in this case, is a new round of frothing PR claims between cable and xDSL modems. Luckily for you, both 3Com and Rockwell are determined to be big-time players in these markets as well, with hopes that they can confuse the bejesus out of consumers once more, getting you to worry over which next high-speed gizmo really is the next step.

High-speed cable modems seem to be a little ahead of the curve when it comes to future standards, as both 3Com and Rockwell have already announced their respective intentions to follow the budding standard set by the Multimedia Network Systems (MCNS) partners—i.e. "large cable companies." The new standard is "data over cable service interface specification" or DOCSIS.

3Com's initial bid to support DOCSIS is a line of cable modems that allow a cable operator's

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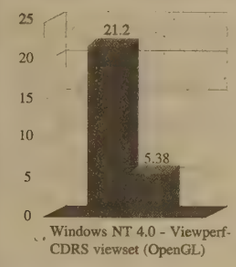
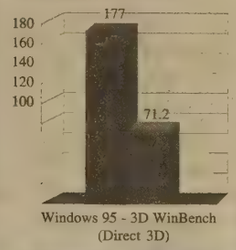


OS:	Windows NT 4.0
Motherboard:	Supermicro P6SKE
CPU:	Pentium II 266 MMX
Testing Software:	Viewperf 5.0 CDRS Viewset

■ WinFast 3D L2300
■ Millenium II

Windows 95



OS:	Windows 95 (OSR2)
Motherboard:	Supermicro P6SKE
CPU:	Pentium II 266 MMX
RAM:	64MB
Hard Drive:	Seagate ST 52520A IDE
Testing Software:	3D WinBench 97

■ WinFast 3D L2300
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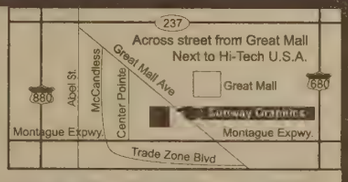

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plant to send data to a home or business at up to 38Mbps. Data can also be sent "upstream" from the consumer to the cable plant at a whopping 33.6Kbps, using either your own or 3Com's x2 modem equipped with telephone connectivity.

Rockwell, meanwhile, claims it will be the first to field complete chipsets for both sides of the cable connection for subscribers like you and companies like your favorite cable company, TCI. According to Rockwell sources, MCNS-DOCSIS-compliant cable modems will enable Internet connections at typical rates of 3Mbps downstream and 1Mbps upstream, with peak rates approaching 36Mbps downstream and 10Mbps upstream. Look for these puppies to show up late in '98.

DSL Wars

Meanwhile, both 3Com and Rockwell are heavily invested in the DSL market that promises high-speed bandwidth over the copper telephone lines that already exist in your home or at your business. Among its other DSL efforts, 3Com, via its purchase of U.S. Robotics, lays claim to have some sort of DSL-style technology to be built into the x2 V.Everything modems available by summer of '98.

On the other hand, Rockwell and its ally Nortel plan to foist their own low-cost DSL standard on an unsuspecting populace; Rockwell recently announced it will build modem chipsets based on its consumer-oriented DSL (CDSL) technology to interoperate with Nortel's 1MB modem technology telephone network equipment. According to Rockwell's PR, this flavor of DSL "requires no rewiring at the telco's Central Office, and no subscriber service call to install a POTS (plain old telephone service) 'splitter' or rewire the home. It is compatible with current POTS voice features and extension phones in the home or business. And the service is extremely tolerant of phone-line length and condition, compatible with the vast majority of all non-loaded telephone lines."

And "non-loaded telephone lines" brings us back full circle. By now we should've figured out that these 56K, cable and DSL modem wars are quick make-a-buck, three-card monte schemes to squeeze every last dime out of decades-old technology and antiquated telco pricing schemes. The real action is run by the telcos, and to a lesser extent the cable companies. Not Rockwell, Not 3Com. Not Microsoft. Not yet.

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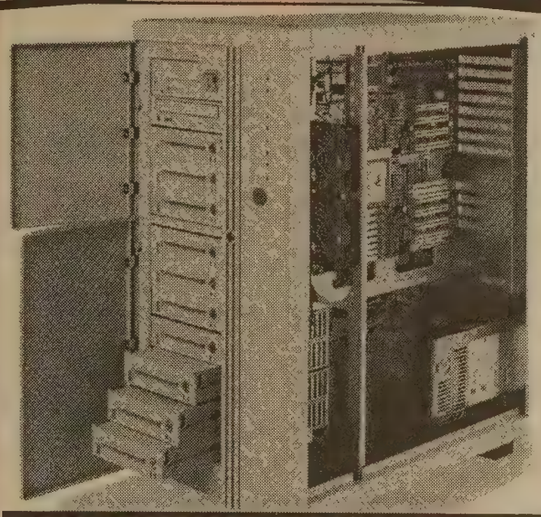

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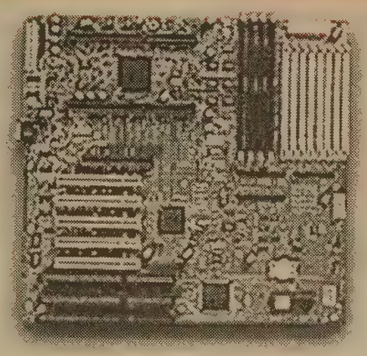

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Case in point. "...compatible with the vast majority of all non-loaded telephone lines." Misdirection is the center piece of every classic con.

Find a non-loaded line. Ask a PacBell sales rep if you can get service for one. Despite their blank response, in fact, there are mega Gigatons of the stuff already deployed. But don't bet on the local "public trust" telephone utility having a clue as to where one line starts and ends after all of these years (a suspicion once hazily forwarded to me by Jack Rickard, fine cigar and cabernet aficionado and Editor Rotundus of *Boardwatch Magazine*).

Better yet, even if you found a non-loaded line, see if PacBell or some other RBOC will let you employ one without Ma Bell getting a cut just for it being there, unused, after 20-odd years as an alarm circuit. In a non-competitive market, that's how telephone companies make their money. Despite a California PUC tariff, wasn't it last year Pacific Bell put a moratorium on alarm circuits for use as data lines? I recall safety and data integrity concerns being hastily mentioned as a ruse to confound the PUC into forbidding wild bands of independent telcos, ILECS, CLECs, ISPs and hordes of unwashed bandwidth-starved consumers from taking advantage of T-1 data rates at ISDN prices.

The point is that one hears all of this blather about this or that DSL working on regular phone lines without taking into account who owns it. First, most active telephone lines are loaded. More importantly, the Bells own it and call the shots. Same for cable companies.

Meet The New Boss, Same As The Old Boss

So now we find PacBell's FasTrack DSL service is available in selected areas of Northern California. Now you may have DSL transmission in California—because PacBell says you can. And so, DNAI, a California-based ISP, and eventually other on-the-bounce ISPs can offer high-speed IP service in those areas as well.

Modem standards? Child's play. Just don't forget how the real game is played. You pay $80 per month to DNAI for the "IP service" for 384Kbps symmetric service. After an introductory period you might have to pay for or lease some DSL modem from 3Com, Hayes, or whoever; minor issue what modem or standard you buy. Doesn't matter.

Because the real catch is you also get to pay $125 per month to PacBell for use of a phone line. Why wasn't DSL available in California last year? PacBell needed time to figure out how to bill $125 per month for an unmetered line instead of $12.95. Now that's a business. ■

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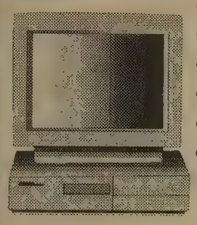

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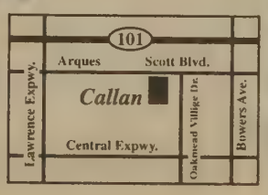

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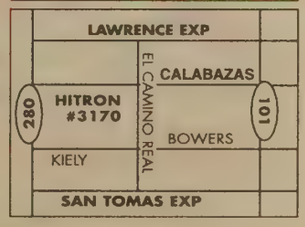

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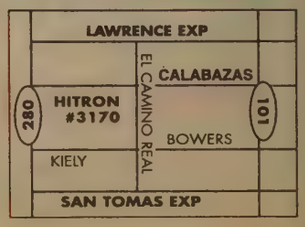

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BY KEVIN M. SAVETZ

Web Cookies

Harmless Convenience, Or Insidious Invasions Of Privacy?

Your Web browser is keeping notes about you. Don't fret, it's not as bad as it sounds. After all, how can something with an innocuous name like "cookies" be bad?

A cookie is simply a note to itself that a Web site leaves on your computer's hard drive. You know how your applications—Microsoft Word, Netscape, and other programs that you use—create preferences files? Cookies are preferences files for Web sites.

Any information that you give to a site can be stored in a cookie, so that next time you visit that site (later that day or even months in the future) the site can read its cookie and remember your preferences. For instance, if you tell the site that you prefer to see the "frames" version of Web pages and that you use Windows NT, the site can stash that data in a cookie. The next time around, it will use frames and tell you about new Windows NT software.

Or you might click your way to the classical area of an online music store using cookies; the store duly notes your penchant for Pachelbel, and on your next visit the site highlights classical releases. Unless you have set your browser to warn you when cookies are added, you probably won't even realize the process has occurred.

Cookies can only store information that you give to the Web site. This includes the basics like what parts of the site you visit. But a site can't get your email address, for example, unless you give it to them.

So, many experts view cookies as mostly harmless. But some folks don't like them—they see cookies as a potential invasion of privacy. Give your credit card number to a Web site, and there's no reason the site can't keep your card info in a cookie to speed your next order.

Privacy advocates wonder if Web sites can snoop on cookies left by other sites. (After all, you don't want *www.shyster.com* to steal credit card info that was stored by another Web site.) With up-to-date Web browsers, this isn't possible.

But cookies work on the Web site's terms, not yours. The site decides what information to jot in a cookie and how to use it. Some users just don't want sites tracking them. Me, I don't mind it much. The sites don't know who I am, nor do they have my email address. I'm just a nameless, faceless Web surfer.

Cookie Central *(http://www.cookiecentral.com)*, a great site devoted to the use and abuse of cookies, has this to say about privacy: "Some people do not like a file that may contain a cookie with information about where they have been, and what they do, if they can stop it. This type of information that is invaluable to some companies. ... Cookies can be used to track you on the Net, what sites you go to, what you like, and so on." Indeed, at least one company uses cookies to track the sites that you visit, then deliver targeted advertising banners.

Cookie Control

For privacy advocates and the paranoid, a cottage industry of cookie-crunching software has cropped up. Utilities with names like Crumbler and CookieCrusher will give you better control of your browser's use of cookies, or just erase all the cookies stored on your computer. (By the way, even without your intervention, cookies don't stay around, clogging your hard drive forever. They can be set by a Web site to expire after a certain date.)

> Password-protected sites can use cookies to store your username and password necessary for logging in—so deleting your cookies can make it a little more difficult to log in to those sites.

Will you suffer dire consequences by deleting cookies or shutting them off altogether? Some sites will forget what ads you've looked at (big deal) and others will forget your preferences. Password-protected sites can use cookies to store your username and password necessary for logging in—so deleting your cookies can make it a little more difficult to log in to those sites.

In Netscape Navigator and Communicator 4.0, you can control how the browser handles cookies. Pick Preferences from the Edit menu, then click on Advanced. You can accept all cookies (the default), accept only cookies that get sent back to the site you're visiting (a more secure alternative if you're worried about advertisers tracking you,) or don't accept cookies at all (the choice of militant anti-cookie surfers).

You can also tell the browser to warn you every time a site places a cookie on your computer. I find this rather tedious—when the cookie warning dialog box pops up, it interrupts the flow of using the Web.

Microsoft Internet Explorer 4 does not include the option to disable cookies entirely, but there is the option to warn you before a cookie is set. You can activate this by choosing Options from the View menu, choosing Advanced and unchecking the "don't warn before accepting cookies" box.

More information is available at Andy's Cookie Notes *(http://www.illuminatus.com/cookie.fcgi)*. There you'll find links, a very good description of how cookies work, and info on using cookies on your own Web site if you are so inclined. ■

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Web Page Listings

COMPUTER PRODUCTS & SERVICES

Aesthetic Solutions *http://www.aesthetic.com* Create dynamic 3-D worlds in minutes using our virtual reality authoring tools—free demo available! [Exp. #176.]

Alpha Innotech *http://www.alphainnotech.com* The leading manufacturer of digital imaging systems (DIS) for the life sciences and semiconductor industries. [Exp. #176.]

Aspen Systems, Inc. *http://www.aspsys.com* Motherboards, workstations, and servers based on Digital Alpha, Intel Pentium Pro, and Sun UltraSPARC chip technologies. [Exp. #176.]

AutoDoc 1.0 *http://www.osc.co.nz* AutoDoc is the latest technology in long document creation for the Microsoft Windows 95 and NT 4.0 platforms. [Exp. #176.]

California Support Calculator *http://www.pegasussoft.com* Pegasus Software offers the California Support Calculator for calculating child and spousal support in the California Family Law courts. [Exp. #175.]

Castelle *http://www.castelle.com* Castelle—pioneers of fax servers and print servers—offers products for LAN managers to optimize their network functions such as printing and faxing over the Internet and intranets. [Exp. #176.]

Choice Systems *http://www.choicesystemsinc.com* Developers of affordable EDI communications, purchasing, and inventory management systems. [Exp. #177.]

Cire Computers *http://www.jps.net/cire* Home-based computer systems, upgrades, Web design, consultation, etc. Also many links to the best Internet software. [Exp. #176.]

CM Solutions *http://www.cm-solutions.com* Management consulting and custom software design. [Exp. #175.]

CompuAll, Inc. *http://www.compuall.com* Complete computer service for hardware, networks, software business systems, Internet, and intranet systems. [Exp. #177.]

Digitax Automotive *http://www.digitax.it* A complete line of taximeters. [Exp. #176.]

EAD Systems *http://www.ead.com* Providing monitor repair service in California and Massachusetts. [Exp. #176.]

FileMaker Pro Shopping Carts On The Web *http://www.blueworld.com/fmpro/carts/* The online directory of e-commerce Web sites using FileMaker Pro 3.0 and 4.0. Users can submit and search listings that showcase their online cyberstores. [Exp. #176.]

GuTech Industries *http://www.gutech.com* Systems consulting services. [Exp. #176.]

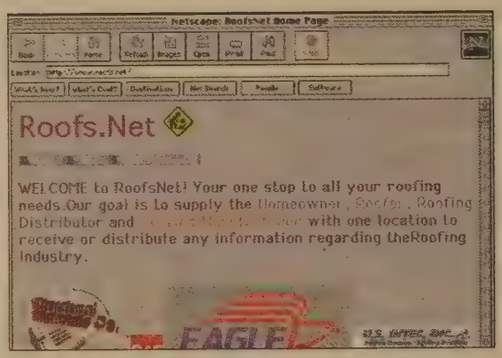
HiTek Solutions, Computer Education Centers *http://www.hiteksolution.com/hiteksolution/* Novell and Microsoft certification training providers. (714) 474-8270. [Exp. #176.]

Input Automation *http://www.inputauto.com/barcode* For 12 years, Input Automation has been developing, supporting and integrating bar code systems. [Exp. #176.]

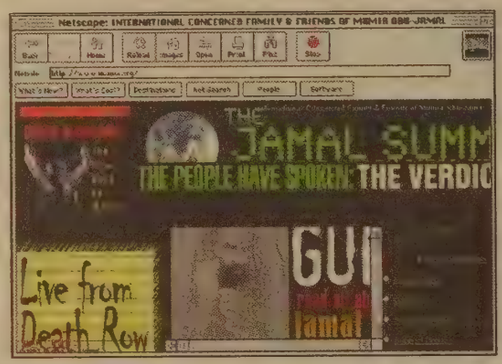
LiveSpy Home Page *http://home.earthlink.net/~aoliver/LiveSpy.html* LiveSpy is a Windows 95 application that periodically updates your desktop wallpaper from an Internet camera. [Exp. #176.]

Low End Mac *http://www.mactimes.com/lowend* [Exp. #176.]

Macompass *http://www.macompass.com* The definitive guide for MacOS users. [Exp. #176.]



http://www.roofs.net



http://www.mumia.org

http://www.nativehands.com

MFC Programmer's SourceBook *http://www.codeguru.com* An excellent online resource for Windows and Visual C++ programmers with lots of source code. [Exp. #176.]

Personalized Computer Services, Inc. *http://www.pcservicesinc.com* Custom-built computers and upgrade center. [Exp. #176.]

Phoenix Techni-Graphics *http://www.newwaveis.com/phoenix* Services, hardware, and software for hybrid CAD drafting and document management. [Exp. #176.]

PSC Distributors *http://www.pscdistributors.com* Distributors of computers and components. [Exp. #176.]

Single Source Information Technology Solutions *http://www.isgcorp.com* Specializing in client/server accounting, distribution, and manufacturing software systems. [Exp. #177.]

Software World, Internet Superstore *http://www.softwareworld.com* Guaranteed unbeatable prices on software, hardware, and accessories. [Exp. #176.]

Superior Computer Systems *http://www.superior-scs.com* We sell IBM-compatible PC's, components, and softwares. Multimedia systems custom-built to user's preferences. [Exp. #175.]

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A2ZBIZ—Total Internet Presence *http://www.a2zbiz.com/* Professional services in site design, multimedia, and hosting. Extensive marketing experience, reasonable prices. [Exp. #175.]

Ability Internet Resource & Web Directory Site *http://www.ability.org* [Exp. #176.]

All4one Submission Machine *http://www.all4one.com/all4submit* One click URL submission to six major search engines in under 30 seconds. [Exp. #176.]

AMULET Consulting *http://www.amuletc.com* We integrate Web site design with database software development; check out our vast range of services. [Exp. #176.]

Basic HTML Tags *http://www.geocities.com/Athens/Acropolis/5969/index.html* Calkid's University, offering lessons on HTML. [Exp. #176.]

Black Kat Design Group *http://www.black-kat.com* Black Kat Design Group creates extraordinarily beautiful and unique Web sites and offers hosting and maintenance. [Exp. #176.]

Creative Computer Solutions *http://www.hooked.net/~davemark/mactech.html* Web design for small businesses, schools, and individuals. Macintosh tech support and training also available. [Exp. #176.]

Dana Point Communications *http://www.beach.net* A network systems integrator specializing in designing custom business applications for Internet and intranets. [Exp. #177.]

Datability Web Presence Provider *http://www.datability.com* A full service Web presence and design provider. [Exp. #176.]

deBarcode *http://www.deBarcode.com* deBarcode helps you to locate a company's Web site if you know its U.P.C. barcode. [Exp. #176.]

Digital Systems Design *http://www.dsysd.com* Web site design services: Web database publishing, online commerce, search engine registration, and animation. [Exp. #176.]

Free Basic Business Listings *http://www.worldprofit.com/bzmall/bzgonzalez.htm* Internet advertising. [Exp. #176.]

FreeCode *http://www.freecode.com* FreeCode archives the source code for over 300 Windows- and UNIX-compatible Web applications written in C/C++, Java, Perl, or Visual Basic. [Exp. #176.]

French Kiss *http://www.anes.com/FrenchKiss* This Web site provides people with a nice Java chat client. You can also set-up your own chat room by inserting the French Kiss applet on your Web site—for free. [Exp. #176.]

Human Ingenuity Industries *http://www.ingenuity.net* Turnkey solution provider: Web design, consulting, hosting, networking systems, and parts. We take you each step of the way. [Exp. #176.]

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Turbo TR 16/4 TR PCI 296
INTEL Token Express Pro 16/4 ISA 271
MADGE Smart 16/4 ISA TR card 229
Smart 16/4 PCI TR card 288
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SMC Token Ring Elite 16/4 Single/12-pack 220/2,431

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3COM SSII SW1000 12 10BT,1 100BTX 1,656
SSII Switch 1000 24 10BT, 1 100BTX 2,318
SuperStack II Switch 3000 12-pt 10/100 Switch 1,900
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SuperStack II Switch 3000 5-pt 100BFX 6,022
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IntraStack 6014 DSB 12 10/100 ports 2,455
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AdvanceStack Switch 224 24-10BT, 1-100BTX 1,428
AdvanceStack 800T 4 100BTX, 4 Open 1,560
AdvanceStack 2000 6-slot chassis 1,776
AdvanceStack 2000 2 100BTX module J3191A 888
AdvanceStack 2000 4 10BT module J3102A 888
INTEL ES510T 24 PORT 10/100 Stackable Switch 3,229
ES500MTX 4 PORT 10/100 Module for 500 Switch 694
ES500MFX 2 PORT 100FX Module for 500 Switch 1,039
ES500MSI Stack interface Module to stack 2 switch 208
ES101TX 8 PORT 10/100 Switch 2,191
ES101MATX 2 PORT 10/100 TX module 1,026
NPI Nuswitch FE200TT PLUS 2 10/100 ports 375
FE200TF PLUS 1 10/100 TX & 1 10/100 FX 680
FE-210 2-100TX, 10-10BT 900
FE-106 1-100TX, 6-10BT 899
FE-224 2-100TX, 24-10BT 1,306
FE-600 + 5-100TX, 1 Open slot 833
NETGEAR SW510 8 10BT + 2 10/100BaseTX 738
SW518 16 10BT + 2 10/100BaseTX 1,109
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SMC EZSwitch Plus 6-10BT, 2 100BaseTX 958
TigerSwitch 8+8TX, 8 10BT+8 100BTX switch 1,670

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CHEYENNE ARCserve v6.1 NLM 10 Users 271
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EXB-8700SW 8mm 7-14GB w/ Server software 1,002
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C1559 Surestor Ext 72-144GB DDS3 autoloader 3,607
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C1599 DDS2 4mm 4-8GB DAT Int/Ext 840/940
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SONY SDT-9000 4mm DDS3 24GB Int/Ext 1,372/1,417
SDT-9000 w/Arcserve Enterprise Int/Ext 2,329/2,432
TECMAR WangDAT 3900 DDS3 12-24 GB DAT Int 1,115
WangDAT 3900 DDS3 12-24 GB DAT Ext 1,240
TS420C-D01 Travan 4-8GB internal 400
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Remote Access

3COM Office Connect Boundary Router 3C8841A 1,244
Office Connect Remote 510 ENET,ISDN 586
Office Connect Remote 520U ENET, ISDN, POTS 733
Office Connect Remote 531U ENET, ISDN, ASYNC 1,098
ARTISOFT InSync Modemshare 1/2/4/8Pt. 108/187/348/592
CISCO 2501 1 ENET, dual serial router (software req) .. 1,906
2514 2 ENET, dual serial router (software req) 2,340
EMULEX Connect Plus 2 ports/8 Ports 582/2,262
NOVELL NetWare Connect 2 309
NetWare Connect 8/32 pts 1041/3,405
NetWare Connect 2-port w/Modem and Serial I/O 845
NetWare Connect 8-port w/Modem and Serial I/O 2,912
SHIVA Netmodem/E 28.8 871
AccessPort/D Enet ISDN router 690
Lanrover/E Plus w/2 Async ports/4 Async 1,334/2,532
Lanrover/E Plus w/2 v.34/8 PT w/4 v.34 ..... 1,771/3,320
Lanrover/E Async 8 Async/8 v.34 modems 2,810/4,528
DIGI INTERNATIONAL Digi 2-Pt/4-Pt/8-Pt 200/455/588
Acceleport 8EM w/RISC CPU, DB25 ISA/PCI 673/673

WAN Connectivity

3COM Impact IQ 3C882 216
ASCEND Pipeline 15 w/ 2 POTS ports NT1 325
Pipeline 25-FX Bridging 457
Pipeline 50 w/NT1, COMP, IPX,IP/ with Firewall 604/946
Pipeline 50 w/ 1 Lease 56 & 1 SW56 1,196
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Max 200 Plus w/4 BRI Cards 3,043
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Cisco 772 4-10BT/Cisco 776 4-10BT, 2 Analog 622/746
HP AdvanceStack Internet Router Card J3138A 2,773
SHIVA Lanrover/E Plus 1-BRI ST, v.34, 3 CHAN 1,918
Lanrover/E Plus 2-BRI ST, 4 Channels, Enet 2,075
Lanrover/E Plus 4-BRI ST, 8 Channels, Enet 3,929
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DataBurst Ext. Parallel Port ISDN w/NT1 275
Paradyne 7610 56/64K DDS CSU for Frame Relay 336
3150 T-1 Frame Relay CSU 1,157
ADC KENTROX D-SERV FrameRelay 56/64CSU/DSU ... 347
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3COM OfficeConnect Gateway 535 ISDN IPX to IP 1,326
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100 Users w/ Dual-Enet & T1 CSU/DSU 3,029
CISCO Microweb Server 907
FARALLON Netopia Internet Router IP/Appletalk 1,061
Netopia Internet Rtr TCP/IP 12-Users/.Unlimited 752/874
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Faxpress 3000 2-line/FaxPress 3000 4-line 2,948/3,574
Faxpress 3500 2-line/FaxPress 3500 4-line 3,434/4,088
CHEYENNE FaxServe NLM 5/10/25 ..... 393/717/1,177
FaxServe NLM 50/100/250 ..... 1,816/2,533/3,801
FaxServe for WinNT 5/10/25/50 Users ... 240/421/846/1,331
LANSOURCE FAXport 5 Users/10 Users 273/406
FAXport 25/50/100 ..... 676/999/1,300
FAXport 4 modem add-on 204
FAXport 5 User add-on/Unlimited Users 204/1,900
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Smart-UPS 2200NET/3000NET 1,067/1,788
Matrix 3000/5000/Smartcell 3,720/4,616/537
SNMP Agent for Novell/SNMP Mgr for Netware 125/145

Cable Testers & Supplies

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AT10K Crimper Kit w/5 DIES & case 259
RJ45 10 BaseT Connectors (100 pak) 40
10Base-T Cable (1000' min) LV3/LV 5 ..... 100/200
FLUKE LAN CableMeter 620/CableMeter 650 ..... 728/1,760
MICROTEST Cable Tester 300
Penta Scanner w/Super Injector 3,019

E-Mail

MS Exchange Server Single w/ 5/10/25 .... 1,014/1,368/2,160
Exchange Server Enterprise w/25/50 Clients 4,099/5,429
Exchange Add'l Clients 5/20 ..... 366/1,160
Exchange Internet Mail Connector 498

Network Management

3COM Transcend Workgroup Mgr for Windows 461
Transcend Enterprise Mgr for Windows 2,453
HP Openview Pro. Suite 1,037
INTEL LanDesk Mgmt Suite 5/10/100 users ... 522/696/4,240
LanDesk Server Manager Pro 1,232
NOVELL LANalyzer for Windows 1,021
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CHEYENNE AuditWare for NDS 100/Enterprise 460/851
Directory Mgmt. Combo/Enterprise 850/1,951
InocuLAN Wrkgrp/1Svr-Unlimited 301/648
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INTEL LanDesk Virus Protect Single Svr NW&NT 329
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ONTRACK Data Recovery NetWare 411
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Server Mirroring

VINCA Campus Standby Server Software for NW 2,955
Standby Server NetWare/Windows NT 2,954/2,586
Entry StandBy Server/SnapShot Svr for NW 985/757
Standby Server Many-To-One 5,172

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Protection Suite for Exch Single/Enterprise 1,183/1,600
EXECUTIVE SOFTWARE Diskeeper/5-Pack 266/1,089
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LANDesk Virus Protect NT 1,028
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Windows NT Server w/5/10 Clients 812/1,128
Windows NT Client Single/20 Clients 34/658
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SEAGATE Backup Exec for NT 1 Svr/Ent 493/864
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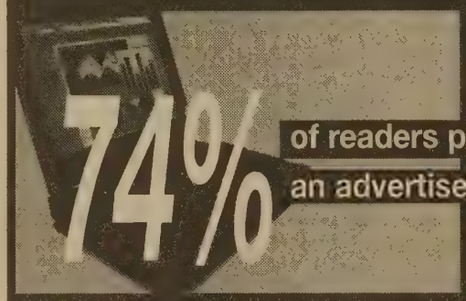

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Inside Java *http://www.inside-java.com* Inside Java provides a showcase of the latest Java topics with advanced Java examples, tutorials and a forum. [Exp. #176.]

Internet Presentations *http://www.ipresent.com clients.htm* Web design, Internet/ intranets, secured sites, and audio/video streaming. [Exp. #176.]

Links *http://www.linksfile.com* Trade URLs with any site listed with us for free! Make money on the Web! [Exp. #175.]

Money Search *http://www.moneysearch.com* A leading business and investment directory features an entirely new way to shop online. [Exp. #176.]

N-Tec Internet Consulting *http://www.n-tec.de* Internet solutions, Web design, multimedia projects, and consulting. [Exp. #175.]

National Direct Internet Yellow Pages *http://www.ndipy.com* Any business in any city can have a free listing in the National Direct Internet Yellow Pages Web site. [Exp. #176.]

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NT Host Web Services *http://nthost.net* Ultra-low-price Web, domain, and email hosting services. Our highest priority is customer service. [Exp. #175.]

Outta Site Web Design *http://www.drjack.com/outta_site* Creative Web page design and consultation. Large graphics and animation library. Great prices. [Exp. #176.]

P-Net *http://www.p-net.com/* P-Net offers complete design, service, and support for your Web pages, including HTML coding, CGI scripting, and scanning. [Exp. #176.]

Paradigm Exchange *http://www.tpex.com* Learn how the Paradigm Exchange is leading the world onto the Internet. [Exp. #177.]

Paradomain Corp. *http://www.pdc.net* Providing Internet services since 1993: 56Kflex, Web $29.95-50MB. Covering all of Southern CA. [Exp. #176.]

Pear Transmedia *http://www.peartransmedia.com* A full-house multimedia development and Web site design firm. From CD-ROMs and screen savers to graphic design and print. [Exp. #175.]

Ralenti Quickfind Building Product Information *http://www.ralenti.co.nz* Specializes in Web site design for the building Industry. [Exp. #176.]

San Jose Web *http://www.sanjoseweb.com* Web presence provider featuring MS FrontPage Extensions, Active Server Pages, database connectivity, and Internet access. [Exp. #175.]

Sponsor Town *http://www.hypermart.net/sponsortown/main.htm* Free Internet service: listing of free home pages, shell accounts, counters, and sponsors. [Exp. #176.]

Start Your Own ISP! *http://www2.apc.net/apcdocs/virtuali.htm* All-in-one hardware solution to get you started on your way to creating a lucrative Internet business! Easy and affordable! [Exp. #176.]

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The Georgia Connection! *http://www.gaconnection.com* Web hosting, development, and advertising as low as $8.95 a month. [Exp. #176.]

The MonkeyPool *http://www.monkeypool.com* We're a team of experienced Internet writers and editors who provide comprehensive content solutions for corporate Web sites. [Exp. #176.]

Time Sheet *http://www.huffman.to/software/timesheet* Time Sheet is a dynamic HTML form used by employees for entering, calculating, and submitting hourly work records. [Exp. #176.]

Ultra-WebTools *http://www.ultra-webtools.com/* Free manuals on Internet topics, as well as remote CGI script hosting and other resources for Web authors and browsers. [Exp. #177.]

Virtualis Systems Web Servers *http://www.virtualisys.com/vr/mjuneau/* Purchase virtual server space with your own domain name for less. [Exp. #176.]

Web MS Promote *http://www.webms.net/promote.html* Listing of the best sites to promote your Web page. [Exp. #175.]

Web Page Design *http://www.tnapowerteam.com/webmaster/design.htm* Web page design service. [Exp. #176.]

Web Site Garage Web Site Analysis *http://www.websitegarage.com* Check HTML, META tags, spelling, design, download, and links. Improve ranking on search engines. [Exp. #176.]

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Wrox Ultimate HTML Reference Database *http://www.rapid.wrox.com/html4db* Covering all the HTML tags and attributes, together with descriptions, permissible values, and the equivalent CSS properties. [Exp. #176.]

ZapMap *http://www.zapmap.com* Interactive, vector-based geographic hot-spot directory of Web sites in Silicon Valley, written in Java. [Exp. #176.]

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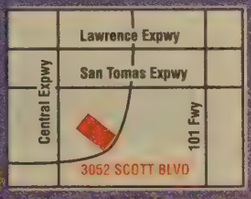

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Web Page Listings *continued...*

FINANCIAL/ REAL ESTATE SERVICES

1% Homeseller *http://www.1homeseller.com* Discounted real estate fees, buyer rebates, homes for sale by owner in Southern California. [Exp. #177.]

Adviesburo van Groote *http://www.horecanet.nl/grootel* Real estate for restaurants in the Netherlands. [Exp. #176.]

Banco Bozano, Simonsen *http://www.bozano.com.br/iindex.htm* The best Brazilian investment bank. [Exp. #176.]

Bob Taylor's OnLine Real Estate Guide *http://www.bob-taylor.com* Discover the historic communities of Northeast Los Angeles. Includes information on mortgage financing, first time buyer programs, home maintenance and more! [Exp. #176.]

Castle Resale *http://www.castle-re-sale.com* Specializing in resale homes in Orange County since 1971. Worldwide referral and relocation, income properties and exchanges. [Exp. #175.]

Chapman Spira And Carson LLC, Investment Banking *http://www.chapmanspira.com* Historical and current economic articles written in understandable language. Some of the material is very unique and we believe that anyone can learn something from this site no matter how sophisticated or whatever the background. [Exp. #176.]

deBeer Realty *http://www.maui.net/~debeer/* A full-service real estate company, serving Maui for nine years. [Exp. #176.]

Dump Debts *http://www.webspawner.com/users/DumpDebts/* Stop all your creditors without filing bankruptcy. Sue them if they refuse to leave you alone! [Exp. #176.]

Fleming Fund Management *http://www.fleming.lu* The leading cross-border provider of funds in Europe. [Exp. #175.]

Pacific Palisades *http://www.PALISADESHOMES.com* Pacific Palisades real estate information. [Exp. #176.]

PBTK Online *http://www.pbtk.com* CPA firm. [Exp. #176.]

Petty & Butler Realty, Inc. *http://www.pbr.com* Internet advertising of PBR, home listings, agents, and services. [Exp. #176.]

Prudential Rand Realty *http://www.randvision.com* Rockland County's premier real estate company. [Exp. #177.]

Seattle Area Homes *http://SeattleAreaHomes.com* Two huge northwest real estate databses. [Exp. #176.]

Synergistics Research Home Page *http://synergisticsresearch.com* Financial services market research organization. [Exp. #176.]

Welcome to Mainstreet-USA *http://www.mainstreet-usa.com* Farm Credit Services provides financial services to agricultural and rural communities. [Exp. #176.]

EMPLOYMENT/ EDUCATION

Alianza *http://www.alianza.org/* Hispanic job posting and job search as well as resume posting and resume search services. [Exp. #177.]

Asia For Kids Educational Catalog *http://www.afk.com* Your best resource for language and culture. [Exp. #175.]

Career Database; Inc. *http://www.careerdatabase.com* Celebrating our 10th year as the world's only formalized database matching an individual's employment history to company and recruiter's search criteria. [Exp. #176.]

Digital Station *http://www.digitalstation.com* Covering computer and Internet-related employment, events, and news in the San Francisco Bay Area. [Exp. #176.]

John Cabot University *http://www.johncabot.edu* Offering study abroad programs and conferring Bachelor's degrees in Art History, Business Admin., Political Science, and English Lit. [Exp. #176.]

Mr. Brain Tutor *http://members.tripod.com/~russmccor/tutor.htm* Live teachers online: tutoring in mathematics, English, computer programming, history, writing, etc. [Exp. #176.]

Prairie Resource Group, Inc. *http://www.prgchicago.com* Prairie Resource Group, Inc. modularizes the executive search process offering customized services on an hourly fee basis, with no contingencies. [Exp. #176.]

Register-It *http://www.registerit.com* Search engine registration and Web site promotion. [Exp. #176.]

Star Technology Group *http://www.startechnology.com* Search firm. [Exp. #176.]

The Tutoring Center *http://home.pacbell.net/tutcen/index.html* Tutoring in math and science for junior high to college. [Exp. #176.]

Union Job Clearninghouse *http://www.unionjobs.com* Posting the open staffing and trades positions in organized labor that are now accepting applications. [Exp. #176.]

ORGANIZATIONS

4work.com *http://www.4work.com* Helping non-profit recruit volunteers on the Internet. [Exp. #176.]

Alameda County Waste Management Authority *http://www.stopwaste.org* A recycling resource for Alameda County, CA and beyond, containing valuable information about recycling in and around the San Francisco Bay Area. [Exp. #177.]

American Biomedical Group *http://www.abgi.net* Helping healthcare achieve maximum cost savings by bringing together engineering, financial and information excellence. [Exp. #176.]

Association Of Macintosh Trainers *http://www.cypher net.com/amt* The purpose of the association is to establish an international network of Apple Macintosh computer trainers, instructors and educators that is easily accessible to end-users and to help facilitate and improve upon the quality of Macintosh computer support. [Exp. #175.]

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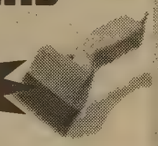

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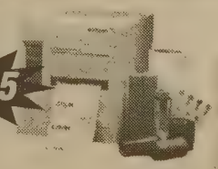

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Web Page Listings *continued...*

Claremont Institute *http://www.claremont.org* [Exp. #176.]

Cult Awareness Resources, CARES *http://cares-care.org* Provides information to the campus community about cult activity, including International Churches of Christ information. [Exp. #176.]

Diabetes Wisdom *http://www.claimtronics.com/diabeteswisdom* Offering diabetes support groups, educational classes, and nutritional therapy. One-on-one with a CDE. [Exp. #176.]

FAT: Fat And Terrific *http://users.ccnet.com/~avery/FAT.html* Bimonthly fat-positive resource and activities newsletter. Meetings third Saturdays of every month. [Exp. #176.]

Foundation For Role Equity Education *http://www.angelfire.com/ok/4equity/* Articles about nontraditional methods of achieving equity. [Exp. #176.]

FXI—Freedome Of Expression Institute *http://wn.apc.org/fxi* [Exp. #176.]

IBEW *http://www.ibew569.org* Labor union for electrical workers in construction, shipyard, low-voltage, and others in San Diego, CA. [Exp. #175.]

ICCA Silicon Valley *http://www.icca-sv.org* The public is invited to the regularly scheduled dinner meetings, fourth Tuesday of every month in San Jose. [Exp. #175.]

J Bellen, D.D.S. *http://www.jbellen.com* Center for Aesthetic Dentistry. Professionals in aesthetic and restorative dentistry. [Exp. #176.]

Jefferson Club: Technologists For Capitalism *http://www.ipser.com/jeffersonclub* [Exp. #176.]

Los Angeles Chapter Of The Internet Society *http://www.usserver.com/isocla/* ISOC LA is a local chapter of the Int'l ISOC (*www.isoc.org*), a non-profit organization promoting the Internet and its Netizens globally. [Exp. #176.]

Los Angeles Macintosh Group *http://www.lamg.org* Non-profit user group offers training programs, meetings, monthly magazine, employment, networking, and tech support. [Exp. #176.]

Lubbock Area Square And Round Dance Federation Home Page *http://www.door.net/lasrdf* [Exp. #177.]

MMTA Home Page *http://www.mmta.org* Home of the MultiMedia Telecommunications Association. [Exp. #177.]

National Center For Employee Ownership *http://www.nceo.org/* Articles, columns, discussions, and interactive training on employee stock ownership plans, stock options, etc. [Exp. #175.]

Native American Women's Health Education Resource Center *http://www.nativeshop.org* [Exp. #176.]

NOCCC (North Orange County Computer Club) *http://www.noccc.org* Web page of computer user group. Meetings: 1st Sunday of the month, 9:00 am, Chapman University, 333 N. Glassell Ave., Orange. [Exp. #176.]

Orange County NetWare Users Group *http://www.computerquest.com/cns/ocnet/* Web site that lists meeting topics, dates, and membership info. [Exp. #176.]

Peninsula Computer Club *http://www.serius.com/~jlo/* [Exp. #175.]

Point Mugu Navy Flying Club *http://www.geocities.com/CapeCanaveral/Lab/1594* Navy T-34 flying club located at the Camarillo, CA airport. Primarily training and recreational flying. [Exp. #175.]

San Francisco FreeBSD User's Group *http://www.arachna.com/freebsd/freebsd-sf.html* Meets the second Thursday of every month in San Francisco to discuss "Turning PCs into workstations." [Exp. #175.]

SEIU Local 250 *http://www.seiu250.org* Local 250 represents over 40,000 healthcare workers in California. [Exp. #176.]

Silicon Valley Association of Software Entrepreneurs *http://www.svase.org* Catalyzing the launch of successful software businesses. [Exp. #176.]

Sutter Lakeside Hospital *http://www.sutterlake.org* Discription of hospital services, community and job openings. [Exp. #176.]

Technical & User Groups Network *http://www.tugnet.org* 24-hour bulletin board, meeting calendar, membership info., articles, reviews. [Exp. #175.]

Telegraph Hill Dwellers *http://www.overmire.com/thd* A San Francisco neighborhood association with news about events, people, history. [Exp. #176.]

Unofficial Nintendo-64 Home Page *http://www.ninentdo64.org* Members only. [Exp. #176.]

PUBLICATIONS

Aboriginal Independent Newspaper *http://www.akai.com.au/* The Aboriginal Independent Newspaper is a self-determination project begun by a group of Nyoongar Aboriginal people in Western Australia. [Exp. #176.]

Antigo Area Shoppers Guide *http://www.antigoshopper.com* A weekly publication with online classifieds serving northcentral Wisconsin. [Exp. #176.]

Bayani Magazine *http://home.earthlink.net/~malaya/bayani.html* An online magazine of Filipino arts and culture. [Exp. #177.]

Bill Bradley Listening *http://thirdage.com/bradley/* A new monthly interactive column written by former US Senator Bill Bradley. [Exp. #176.]

Comics Conspiracy *http://www.comicsconspiracy.com* Comics retail and publishing. [Exp. #176.]

Confucius Publishing Co. Ltd. *http://www.confucius.org* Confucius' sayings and information in sixteen languages plus over 200 rare pictures. [Exp. #176.]

Defense Systems Daily *http://defence-data.com* The Internet's premier daily news magazine for the international defense and aerospace industry. [Exp. #176.]

Easy Jewish Cooking *http://www.jcn18.com/scripts/jcn18/paper/Index.asp?ColumnID=102* Cooking articles and recipes by Rosalyn Manesse, author of the book *Easy Kosher Cooking*. [Exp. #175.]

Edition Shimizu *http://www.chabashira.co.jp/~dmano/* An international e-zine for communication, art, education, and cross-cultural understanding. Japanese and English editions. [Exp. #176.]

Electronic *http://home1.gte.net/tstudios/e-pub.html* Thompson Studios can convert your manuscript into an electronic book. You can then market and distribute via the Internet. [Exp. #175.]

Flamenco-world.com *http://www.flamenco-world.com* The only bilingual (Spanish/ English) magazine on the Net about Spanish culture and flamenco music made in Spain, absolutely for free. [Exp. #177.]

Jewish Heritage Online Magazine *http://www.jewishheritage.com/* This new, online magazine makes Jewish learning thoroughly accessible and enjoyable using the latest in interactive technology. [Exp. #177.]

LaoSearch & Southeast Asia Country *http://www.angelfire.com/ca/laoscom/* A Web directory for information on Laos and other Southeast Asia countries. [Exp. #176.]

The Last Katun *http://www.jps.net/redcoral/LastKPt1.html* A novel of the past and the future, by John Curl. [Exp. #177.]

Latin American Arts & On-Line Journals And News *http://www.syspoint.com.br/joycelarronda* Gallery of Latin American artists and special professional news for intranets. [Exp. #175.]

Montana Magazine *http://www.napias.com/mtbooks.html* Montana pictorial books direct from publisher in Helena, MT. [Exp. #176.]

New Information And Communication Technology In Africa: A Bibliography Of Online References *http://www.untpdc.org/untpdc/incubator/africa/biblio.html* . [Exp. #176.]

Obesity Meds And Research News *http://www.obesity-news.com/* Online newsletter and Web site on obesity research. Hard copy also available. [Exp. #176.]

Pixel Plane *http://www.pixelplanet.com* Reviews of computer graphics software, books, games, comics, programming tools, movies, laser discs, music and more. [Exp. #176.]

Stereography Megazine *http://www.stereography.com/gravenimages* Stereo for your eyes! Covering art and science of stereoscopic imagery, supporting LCS glasses. [Exp. #176.]

Tech Resources Unlimited *http://www.trucorp.com* Computer technology books and software store. [Exp. #176.]

Trans-Atlantic Online *http://www.transatlanticpub.com* Wide variety of books available from Trans-Atlantic Publications. [Exp. #176.]

Two Dog Press *http://www.twodogpress.com* Publishers of distinctive and memorable books of poetry and books about dogs. [Exp. #176.]

unGROOM'd *http://www.ungroomd.com* The men's perspective on engagement, marriage and what follows. [Exp. #176.]

Whitepapers With Attitude *http://www.jkworld.com* A monthly newsletter for people who deploy enterprise groupware. [Exp. #176.]

ODDS & ENDS

Advanced Kinesiology Concepts *http://www.geocities.com/hotsprings/7756/* Innovative approaches to holistic health using advanced kinesiology, radionics, and huna. [Exp. #176.]

Awareness Holistic Books And Information Center *http://www.jps.net/aware* Holistic health, books, info, gifts, and classes in San Mateo. [Exp. #175.]

Bottled Water Web *http://www.bottledwaterweb.com* Everything you need to know about bottled water, including new bottler's profiles, resources, links, and classified ads. [Exp. #176.]

Central & East European CrimiScope *http://www.ceeds.com/cee-crimiscope* CEE CrimiScope's misson is to enhance worldwide awareness and support of the fight against crime, corruption, and terror in Central and Eastern Europe. [Exp. #176.]

CME Home Page *http://www.ryalsmeet.com* A comprehensive listing of national and international continuing medical education courses. [Exp. #177.]

Franco Manenti snc. *http://www.manenti.it* Church ornaments and religious articles. [Exp. #176.]

Hatha Yoga *http://www.geocities.com/~skrshnananda/Hatha.html* [Exp. #176.]

Investment And Speculation Psychic *http://www.concentric.net/~L77280r/PSYCHIC.shtml* Provides a free divining of investment and speculation in the DJIA, stocks, bonds and gold. [Exp. #177.]

Kid Vision *http://www.kidvision.com* See live video of your child in day care over the Internet! [Exp. #176.]

King & Queen Of Hearts *http://www.geocities.com/westhollywood/6482* A fund raiser for Friends for Life. [Exp. #176.]

Korea Narrow Loom Iron Works *http://soback.kornet.nm.kr/~sepok* Manufacturer of high-speed narrow fabric needle loom, knit braiding machine, winder, warping machine, etc. [Exp. #176.]

Lladro Porcelain, Spain *http://www.accessnet.es/lladro* Lladro porcelain and Swarovski crystal. [Exp. #177.]

Medic Alert Home Page *http://www.medicalert.org* Emergency medical information and identification (ID). [Exp. #176.]

Phoenix Center For Clinical Research *http://www.pccr.com* A center for pharmaceutical clinical trials and drug development. [Exp. #175.]

Pigeons *http://www.ozemail.com.au/~pigeons/index.html.html* Breeding centre for racing pigeons. [Exp. #176.]

Pipe Organs And Music *http://orgel.com* Information on pipe organ building and design. History of the organ and its music. [Exp. #175.]

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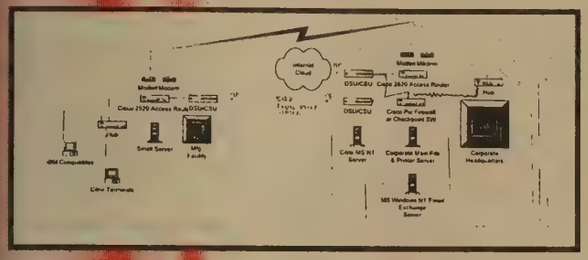

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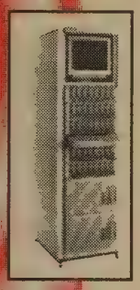

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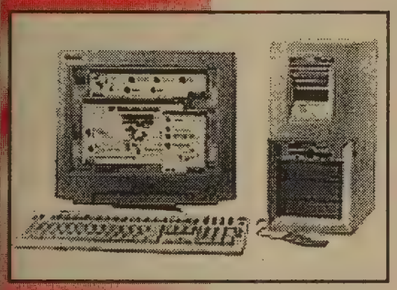

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HP Vectra VL PC with Pentium® II Processor
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HP Kayak XA PC Workstation
The most advanced high-performance PS. Voted "Editor's Choice" in June 1997 *PC Magazine* and March 1997 *Computer Reseller News*. Available with 233MHz, 266MHz or 300MHz Pentium® II processors. #D3933A
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HP Kayak XU PC Workstation
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Starting at $3,319

HP Kayak XW PC Workstation
The very best graphics workstation with HP VISUALIZE fx4 graphics subsystems. Includes HP AccelECLIPSE and HP Fast RAID. Available with 266MHz or 300MHz Pentium® II processors. #D5505N
Starting at $7,172

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Web Page Listings *continued...*

Pixel Photo *http://www.pixelphoto.com* A digital imaging and digital photography guide for advertisers, art directors, and production managers. [Exp. #176.]

Plastic Surgery Interactive Resource *http://users.aol.com/jdisaia* The place for honest information on cosmetic surgery. Now with an online multimedia program for download. [Exp. #175.]

RoofsNet *http://www.roofs.net* Supply the homeowner, roofer, roofing distributor, and roofing manufacturer one location to receive or distribute any information regarding the roofing industry. [Exp. #176.]

Shelter Assistance Association *http://mario.speedsoft.com/shelter/* A non-profit corp. whose mission is to provide the communication link between recovery-based facilities and the person on the street suffering. [Exp. #177.]

Southwest Volcano Research Centre *http://www.goodnet.com/~ej76707/* Volcano eruption forecasting and updates on latest eruptions worldwide. [Exp. #176.]

Sunshine International Penpals *http://sunshine-girls.com/* Asian women desire romance, marriage. World's largest correspondence service since 1984. Free photo-brochure. [Exp. #176.]

The Waters Edge *http://www.waterdesign.com* A retreat and a resource for the creative business spirit. [Exp. #176.]

Yoga *http://www.yoga-autoconocimiento.net* A site for concentration and mediation. [Exp. #176.]

PERSONAL HOME PAGES

Ancient One's Crypt *http://www.geocities.com/SunsetStrip/Venue/9921/* Fun for all ages! Java Script, music, links, chat, and more! Get your fill here! [Exp. #177.]

CARveat Emptor: Tricks of the Great American Car Deal *http://www.well.com/user/kr2* Lemon-proofing the great American car sales, lease and service deal for village and family values. Trunkloads of free info and references. [Exp. #176.]

Cool Stuff *http://www.geocities.com/SiliconValley/6555* Useful stuff for your PC, HTML links, animated gifs, Looney Tunes, and more cool stuff. [Exp. #176.]

Daniel Contreras Home Page *http://home.pacbell.net/contrera/index.html* Daniel Contreras is a Chicano activist in Southern CA. My site contains several interesting Latin links and will soon contain an art gallery honoring Mexican heroes. [Exp. #177.]

Eric's KittyKat Korner *http://members.tripod.com/~KittyKorner* RealAudio songs for cat lovers; pics of my orphaned and saved kitty's. [Exp. #176.]

GPF Avoidance *http://home.earthlink.net/~khronos* Century cable gripes, Carl Sagan, Hodgkin's disease, hyperlinks, and more. [Exp. #176.]

It's A Wonderful World *http://www.ifw-lmc.com/kindness.htm* For people who are interested in creating a safe and trusting world for all people. [Exp. #176.]

Marc D. Nickelson Personal Web Resume *http://www.careersteps.com/nickelson* This is my personal Web resume highlighting my employment history and education. I am seeking an entry-level position in the computer industry. [Exp. #177.]

Mark L. Falconer Film Page *http://members.aol.com/MFalc1/home.html* Reviews of current films and videos. Occasional commentary on the industry. [Exp. #176.]

Phil Walsh Home Page *http://kspace.com/walsh* Based in Canyon Country, CA, Phil Walsh is a freelance artist who does graphics, animation design, and the fine arts. [Exp. #175.]

World Wide Pet Names Project *http://www.wellwellwell.com/petnames* Browse thousands of unique pet names. Add your own favorites. Make your pet world famous! [Exp. #176.]

GOVERNMENT/ POLITICS

Biodiversity Forum: Discuss Nature Conservation Online *http://real.geog.ucsb.edu/bioforum/home. html* Biodiversity Forum is a site for people like you to express views related to biodiversity loss and conservation. It is designed to serve public education, exchange, and opinion research objectives. [Exp. #176.]

Bureau Economique en France *http://www.cotedivoire.co* Site officiel du Bureau Economique: Paris and Washington. [Exp. #175.]

Corporate Watch *http://www.corpwatch.org* As all the Fortune 500 companies jump onto the World Wide Web bandwagon, who's keeping an eye on them? Corporate Watch is! [Exp. #175.]

First Amendment Center *http://www.fac.org* Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; of the right of the people peaceably to assemble, and to petition the government for a redress of grievances. [Exp. #175.]

Health Finder *http://healthfinder.gov* Designed to provide consumers with easy access to the widest range available of online, accurate, up-to-date health information from the US government and its many partners. [Exp. #175.]

Irish Trade Board's Internet Supersite *http://www.irishtrade.ie* Providing international buyers with comprehensive access to the sourcing capabilities of Irish companies. Available in six languages. [Exp. #176.]

K9 Officer's Reference Page *http://www.neosoft.com/~jmsjr/index1.htm* A reference page for law enforcement canine officers. [Exp. #176.]

Ken's Communist Comics *http://www.geocities.com/Area51/2369/kcc.html* The only communist comics shop in California. Our prices are Marxerific and the service is Maovelous! [Exp. #175.]

Library Of Congress Information Bulletin *http://www.www.loc.gov/loc/lcib* [Exp. #175.]

Mumia Abu-Jamal Web site *http://www.mumia.org* Learn more about Mumia Abu-Jamal, read the latest updates on his case. [Exp. #176.]

Peacemaking & Crime *http://www.westga.edu/~jfuller/peace.html* Peacemaking & Crime seeks to provide information about peacemaking in the US criminal justice system and about alternatives to the war on crime perspective. Features include news items, an explanation of the perspective and links to related sites. [Exp. #176.]

Political Ecology Group *http://www.igc.org/peg* PEG is a multi-racial, volunteer-based organization working for environmental justice in the SF Bay Area. [Exp. #175.]

Secret FBI Files Web Site *http://www.crunch.com/01secret/01secret.htm* Thousands of secret FBI files, never before suspected. [Exp. #176.]

Social Development Web Site Of Pakistan *http://www.digitalin.com/devpak* Pakistan's first Web site on social sectors. [Exp. #175.]

US Consumer Information *http://www.pueblo.gsa.gov* Find the latest information from more than forty US government agencies. [Exp. #175.]

User's Gude To The Declaration Of Independence *http://www.founding.com* Mainly for educational institutions, this site has 10,000 pages of essays, tracts, sermons, and other documents from the Founding Fathers. [Exp. #176.]

ARTS

A Odisho 3D Gallery *http://www2.inow.com/~mystery/gallery* A gallery of some nice, original 3-D pictures. Not many, but will add more soon. [Exp. #176.]

All *http://www.allarts.com* Fine Art prints and reproduction sales. [Exp. #177.]

American Photographer In Spain *http://www.angelfire.com/ca/fotografo* Fine B&W photography and Spanish landscapes! New format with great photos, and Spanish links too! [Exp. #176.]

Art Designer And Sculptor *http://www.rhughesartdesigner.com* Sculpture, private commissions, mobiles and prints. [Exp. #177.]

Art Of All Sorts *http://www.artofallsorts.com/* Buy reproductions of the great masters online! Cezanne, Chagall, WuChen, Gauguin, Hiro-shige, Kahlo, Klee, Matisse, Monet, O'Keefe, Van Gogh, and more. [Exp. #176.]

Artist Roz Dimon *http://www.users.interport.net/~rozdimon* This incredibly famous artist spins an ongoing tale. [Exp. #176.]

Cannonball Express *http://www.best.com/~canonbal* A video project-in-progress about urban firestorms, fire safety and environmental issues. [Exp. #175.]

Digital Snapshot Of The Day *http://www.kurz.net/* A photo gallery of digital photo snapshots. Take a close look at the snapshot of the day, which is updated daily by Martin Kurz. Everyday life gives us the best subjects. [Exp. #175.]

Gary Wagner Fine Art Photographer *http://www.garywagner.com* Fine art photography. [Exp. #175.]

Golden Gate Gallery *http://goldengategallery.com* Modestly priced art prints and originals by noted California artists, especially Don Irwin and Jane Gallagher. [Exp. #176.]

Native Hands Gallery *http://www.nativehands.com* The brainchild of Navajo silversmith Jennifer C. Redhorse, this new site is devoted to the history, techniques, materials, and makers of Indian silver jewelry. [Exp. #176.]

PhotoSphere Images, Ltd. *http://www.photosphere.com* PhotoSphere offers professional, royalty free stock images on CD-ROM, covering people, places, nature, backgrounds, and the economy. View our images and order collections online. [Exp. #176.]

Selected Poems, 1997 *http://members.aol.com/TerryMcCa/home.html* A page of enjoyable, edifying, and thought-provoking poetry. Updated frequently. [Exp. #175.]

Southwest Art Liquidation *http://www.fine-art.com/southwestart/Western* Native American art, bronzes, lithos, originals, sands, and more! [Exp. #176.]

Ted Alvy Cosmos Topper Home Page *http://pages.prodigy.com/FNJD74A* Art of '60s L.A. underground radio, rebop, beatniks, hipsters, hippies, zoot horn rollo. [Exp. #175.]

Wild Images By KKRImages *http://members.aol.com/denali33/cards/kkrimageshome.html* The site is about nature photography. [Exp. #176.]

ENTERTAINMENT /LEISURE

20 Something *http://home.inreach.com/droysdon/jroysdon/20something/* Undernet IRC is for people in their twenties and looking for good clean chat. [Exp. #177.]

Abercrombie & Kent *http://www.abercrombiekent.com* Adventure travel. [Exp. #176.]

Across The Bay Tent And Breakfast Adventure Co. *http://www.tentandbreakfastalaska.com/* How about stunning Kachemak Bay, in Southcentral Alaska, surrounded by rainforest, mountains and glaciers on the Kenai Peninsula. The only way to get to us is by water taxi, air or tour boat. Fly direct. [Exp. #176.]

Actual St. Louis *http://www.actualstlouis.com* An information showcase for and about St. Louis, MO. [Exp. #176.]

Ames Music CD's, Cassettes, And More! *http://www.AmesMusic.com* [Exp. #177.]

Arcade Classic's ROM World *http://www.geocities.com/TimesSquare/Arcade/5187* Over 250 of your favorite classic arcade games free to download on your PC. [Exp. #177.]

continued on page 212

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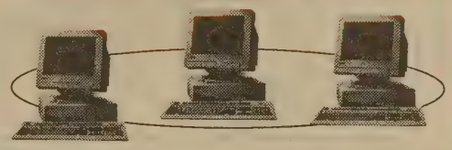

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- 17" Proton 1280x1024 .25 (NEC Tube) Green Monitor
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233MMX $1389
200MMX $1299
166MMX $1199
AMD K6-200 $1254
AMD K6-233 $1274

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- PCI Motherboard Manufactured by FREE Technology
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- **2MB Trident 9680** Graphics Card
- Medium Tower Case
- 104 Keytronic Keyboard
- Logitech Mouseman PS2 Mouse
- 15" **Proton** 1280x1024 .28 MPR-2, digital, Green Monitor
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AMD K6-200 $894
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Adaptec 2940UW PCI Wide SCSI w/Kit	224

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Sound Blaster 16	54
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US Robotics 33.6 w/Voice Int.	119
US Robotics 56K w/Voice Int.	159

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14" Proton 1024x768 .28	$179
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17" Sony 200SX 1280x1024 .25	619

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Medium Tower w/230W	52
ATX Form Medium Tower	79
ATX Form Full Tower	94

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Logitech Mouseman PS/2 or Serial	$29
Mitsumi Serial Mouse	9.50
Mitsumi PS/2 Mouse	12

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Windows 95, CD (SR-2) ver.	$99
Windows NT 4.0 Workstation.	159

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Panasonic 1.2MB	46

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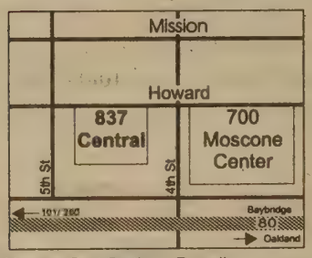

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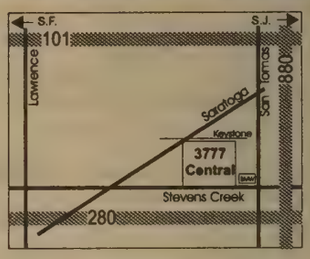

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- ESS 16 IDE **w/ Yamaha OPL-3 Sound**
- 33.6 Internal Fax/Modem
- SD880 Multimedia Speakers
- Mitsumi ZW Keyboard
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- **16X** max CD-ROM
- Teac 1.44MB FDD
- **Diamond** 2500 2MB PCI Video Card
- ESS 16 IDE w/ **Yamaha OPL-3 Sound**
- Mitsumi ZW Keyboard
- **Microsoft** Serial Mouse
- **SD880** Multimedia Speakers
- **Microsoft Windows 95** CD
- IWG500 Mid-Tower Case w/ 230W
- **Monitor not included**

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-Altec Lansing ACS45 with Sub-Woofer
-Keytronic PS/2 Keyboard, MS PS/2 Mouse w/ Pad
-ATX #A2 Mid-Tower Case w/ 235W Power Supply
-Monitor not included
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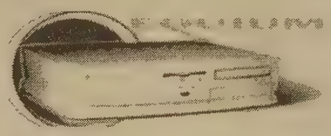
-Creative Labs Vibra 16C Sound
-Intel EtherExpress Pro/100B Lan Adapter
-PS/2 Keyboard & Mouse
-Microsoft Windows® 95 OSR2
-Desktop Case
-3 Year Manufacturer Warranty



Options:
-32MB upgrd $130
-15" Toshiba Monitor $375
-17" Toshiba Monitor $655
-USR 56k Modem Int $165

200MHz Pentium® MMX **$1400**

Central Business Series

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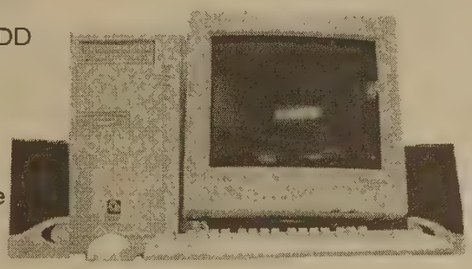
-24X max CD-ROM Drive, Teac 1.44MB FDD
-Matrox Millennium II 4MB PCI or
ATI XPERT@Work 4MB PCI
-ESS 16 IDE w/ Yamaha OPL-3 sound
-33.6 Internal Fax/ Modem
-ATX #A2 Mid-Tower Case w/ 230W
-Keytronic PS/2 Keyboard, MS PS/2 Mouse
-Microsoft Windows 95 CD
-SD880 Multimedia Speakers
-Monitor not included
-2 Months of Free Internet with Sirius



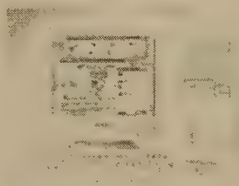
AMD K6-233 w/ MMX™ **$1199**

AMD K6-200 w/ MMX™ **$1139**

AMD K6 MMX™ ENHANCED PROCESSOR

HP BRIO D5556A

-32MB RAM, 256k Cache
-3.2GB HDD
-24X CD-ROM
-S3 Trio64-V2 2MB
-PS/2 Keyboard & Mouse
-Microsoft Windows 95 OSR2
-Microsoft Word
-Mid-Tower Case
-3 Years Manufacturer Warranty



Options:
-32MB upgrd $179
-15" HP Monitor $325
-17" HP Monitor $599
-USR 56k Modem Int $165

233MHz Pentium® MMX **$1615**

Bundles

-Microsoft Bundle #1 (Home) . . add $39
(Encarta '97, Works 4.0, Money)

-Microsoft Bundle #2 (Sports) . . add $24
(Flight Simulation 5.1, Complete Basball, Golf 3.0)

-Microsoft Bundle #3 (Kids) . . . Add $34
(Creative Writer, Explorapedia, Magic School Bus)

-Microsoft Office 97 Small Business Edition
(with complete manuals and CD)
and Microsoft Works / Money . Add $249

Academic Office Suite:
(Current Student ID Required)

-Microsoft Office 97 Standard . . . add $145

-Microsoft Office 97 Pro . . . . . Add $189

Note: Add $20 for pre-load / installation

Tech. Services

-System Diagnosing
-Onsite Repairs
-Printer / Monitor Repairs
Installation:
Primary (1st) HDD $20
Secondary (2nd) HDD $30
Memory $15
Modem $30
CD-ROM Drive $20
Tape BackUp Drive $20
Other Hardware $30/hr
Software $30/hr

MMX is a trademark and Pentium is a registed trademark of Intel Corporation

*(sale price) . . . . . SPECIALS, limited to stock on hand
Prices subject to change without notice.*

http://www.centralcomputer.com for current prices & catalog

HARDWARE

1. CD DRIVES & SOUND

ADDONICS
12X Parallel Port CD Rom w. Sound ... 299
20X Max Pocket CD Drive PCMCIA ... 315
24X External CD Drive ... 279

CREATIVE LABS
Midi Kit + Software ... 65
Sound Blaster 3D 16 PnP (w/o IDE) ... 49
Sound Blaster 64 AWE oem / Value Pak ... 79/95
Sound Blaster 64 AWE Gold ... 179

MITSUMI
FX1402S2 16X IDE Int ... 69
FX240S 24X IDE Int ... 79

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CDR-1610 16X SCSI Int oem ... 95
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DVD301 SCSI Int ... 279

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PX-20X SCSI Int (Tray) ... 199
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PRD-650 Portable 6X w. PCMCIA Kit ... 315

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CD516S 16X SCSI Int ... 115
CD532E 32X IDE Int ... 105

TOSHIBA
DVD Drive IDE w. Kit oem ... 279
5701 12X SCSI Int ... 99
XM6102B 24X IDE Int ... 85
XM6202B 32X IDE Int ... 105

TURTLE BEACH
Multi-Sound Fiji 20-bit / w. Digital I/O ... 275/329
Multi-Sound Pinacle 20-bit / w. Digital I/O ... 375/425
Pinacle Project Studio ... 495
Tropez Sound 32 Voice ... 145
Wave Table Sound 32 ... 99

OTHERS
CD Caddy ... 3.99
CD Jewel Case for 1 / 2 / 3-CD ... 0.55/0.65/0.55
CD Wetsuit for 12 / 24-CD (Kensington) ... 9.95/13.95
Decoder Card ... 129
ESS 16 IDE 3D Sound Card ... 25
Gravis Ultrasound Plug & Play ... 135
Gravis Ultrasound Pro, PnP ... 175
J-Bond MF-719 Yamaha 3D 32 w. Midi ... 39
*Television: Telesound EX16 IDE ... *(68)*

WRITABLE CD DRIVES:
Adaptec Easy CD Creator Deluxe Software ... 89
Elektroson Gear CD Creator Software ... 95
HP C7110i Surestore 6X/2X IDE Int ... 399
HP C7110e Surestore 6X/2X Parallel Ext ... 499
Phillips Omniwriter Rewritable 6X/2X Int, oem / reg ... 459/499
*Ricoh Rewritable 6X/2X SCSI Int ($100 Rebate) ... *(499)*
Sony Spressa 928E/H 8X/2X IDE Int ... 329
Sony Spressa 960 6X/2X SCSI Recordable ... 385
Yamaha CDR-400 6X/4X Ext ... 569
Yamaha CRW4001 EIDE Int, 6X Read, 4X Write, 2X Re-write ... 569

3M or Pioneer CDR 74 min. / 10-pk ... 4.50/43
HP Rewritable CDRW (C4431) ... 19.95
HP CDR 74 min. (C4432) / 10-pk / 25-pk ... 3.59/32/69
Kodak CDR 74min. / 10-pk / 25-pk ... 3.59/32/69
Ricoh CDRW 74 min. ... 17.95
Sony CDR 74 min. / 10-pk ... 4.95/47
Ricoh or TDK CDR 74 min. / 10-pk ... 4.50/43

SPEAKERS:
Altec ACS45 w. Sub-Woofer ... 79
Altec ACS51 / ACS52 / ACS53 ... 65/85/125
Altec ACS150 / ACS500 ... 99/295
Labtec Stereo LCS-150 / LCS-600 ... 18.95/24.95
Labtec 1002 (10W) ... 49
Labtec 1224 Space Server 3D Stereo (10W) ... 69
*MLF-CP55 Mini Speakers (4W) ... *(4.99)*
*Yamaha YST-M7 (5W) ... *(39) 45*
*Yamaha YST-M45 ... *(59) 69*
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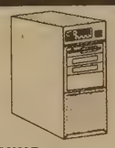
SPECIALS
*HM2: Headset w. volume control ... *(9.95)*
*KC3: Headphone + Microphone ... *(6.95)*
*MC1: Pocket Size Microphone ... *(5.95)*
MC2: Condensed Microphone ... 9.95
SD202: Full Range Speakers, 120W ... 24.95
*SD322: Sub-Woofer ... *(35)*
*SD688: Deluxe 3D Surround 360W ... *(45)*
*SD880: Amplified Stereo Speakers 200W ... *(25)*
*SD980: 3-way Speakers 180W ... *(35)*

Resellers CALL for wholesale prices!

2. CASE



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CF7023: 2 half ht SCSI-3, 80W ... 105
CF7041: 4 half ht SCSI, 200W ... 99
CF7042: 4 half ht SCSI-2, 200W ... 125
CF7043: 4 half ht SCSI-3, 200W ... 129
CF7081: 8 half ht SCSI, 250W ... 195
CF7083: 8 half ht SCSI-3, 250W ... 249
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ANTEC
KS-011+RPP3002: 19 Bay Server (9 front, 10 int. bay) 300W, Hot Swap + Redundant P/S, 2 Fans ... 569
KS-011+RPT600: 19 Bay File Server (9 front, 10 int. bay) 300W, Redundant Vertical AT P/S, 2 Fans ... 459

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750S: Full Tower w. 300W / 400W ... 195/235

3. CONTROLLERS

adaptec
2940 SCSI PCI w. Kit oem ... 179
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2940UW Ultra-Wide-SCSI PCI Kit oem / reg ... 229/279
AAA-131 Raid Single Channel / CA ... 435/525
AAA-133 Raid 3 Channel ... 689
AHA3940 PCI Multi-Channel SCSI ... 399
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COREL
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Fire Port 40 Ultra SCSI PCI oem / reg ... 155/179

initio
SALE
INI-9100 SCSI PCI PnP ... 69
*INI-9100U SCSI PCI Kit, 20Mb/s ... *(129)*
*INI-9400UW Ultra-Wide SCSI PCI Kit ... *(169)*
*INI-9200U Dual SCSI PCI ... *(215)*
*INI-9200UW Dual Ultra-Wide SCSI PCI ... *(259)*
*INI-9520U Dual SCSI + Ether Combo ... *(285)*
*INI-9520UW Dual + Ether Combo ... *(335)*
*INI-9400U Quad SCSI Ultra ... *(395)*
*INI-9400UW Quad Ultra-Wide SCSI ... *(459)*

KOUWELL
KW557A IDE/ 1.44/ 2S (FIFD)/ ECP/ 1G ... 22

LDP (LOMAS DATA)
*Fast SCSI-2 PCI 10Mb/s ... *(99)*
*Fast PCI 20, Ultra-Wide-SCSI 40Mb/s ... *(195)*

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Bustoaster SCSI-2 PCMCIA ... 165

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CN2419 EIDE/ 4HD/ 2FD/ 16-bit ISA ... 49
CN2420 EIDE/ 4HD/ 16-bit ISA ... 39
CN2424 EIDE/ 4HD/ 2FD/ 2S 1P 1G/ 16550/ IEEE1284 ... 62

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- Boxed version w. 3 yr warranty ... 189
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- Boxed version w. 3 yr warranty ... 239

Cyrix (W. FAN)
6x86MX-P166 / boxed version ... 119/139
6x86MX-P200 / boxed version ... 169/189

intel
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MMX-200Mhz Pentium® / w. 3 yr. warranty ... 229/245
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Pentium® Pro 200Mhz w. fan & 256k ... 519
Pentium® II 233Mhz w. fan / 3 yr warranty ... 315/315
Pentium® II 266Mhz w. fan / 3 yr warranty ... 589/589
Pentium® II 300Mhz w. fan & 3 yr warranty ... 809

OverDrive®:
Pentium® 133Mhz (fr P-60 / 66) ... 199
Pentium® MMX166Mhz (fr P-100 / 133) ... 215
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OTHERS
Cooling Fan for 486 CPU ... 4.95
Cooling Fan for Pentium® processor ... 6.95
Edimax CPU Switch:
- CAS221 VGA, Keyboard, Mouse for 2PC ... 145
- CAS421 for 4PC (AT & PS/2) ... 215
- CAS601 for 6PC AT only / PS/2 ... 235/236

5. DIGITIZER

SUMMASKETCH (CALCOMP)
*III 12x12, 4 or 6 button Cursor or Stylus ... *(249)*
III Pro 12x18, 4 button Cursor ... 465

WACOM
*Art Pad II 4x5, w. Erasing Ultra Pen, PC ... *(129)*
Art Pad II 4x5, w. Erasing Ultra Pen, MAC ... 139
*Art Z II 6x8, w. Erasing Ultra Pen, PC ... *(299)*
*Art Z II 6x8, w. Fractal Expression, PC ... *(359)*
Art Z II 6x8, w. Painter 5.0, PC ... 385
Art Z II 6x8, for MAC ... 309
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Art Z II 12x18, w. Erasing Ultra Pen, PC ... 685
CT-0405 Pen Partner w. Corel Print & Photohouse ... 95
UC-520 4-button Pack ... 45
UD-2 MAC Kit ... 45
UP-201 Pressure Sensitive Stylus ... 49.95
UP-701E Erasing Ultra Pen ... 64.95
UP-801EW Erasing Ultra Pen ... 69.95

6. DRIVES

One Year Warranty on All Disk Drives

FLOPPY DRIVE:

MITSUBISHI
LS-120 120MB w. cartridge, 3.5" ... 135

TEAC
1.44MB 3.5" / w. frame ... 25/29

HARD DRIVE:

FUJITSU
M3026AT 2.6GB 10ms 128k IDE DMA ... 165
M3035AT 3.5GB 10ms 128k IDE Ultra-DMA ... 189
M3052AT 5.2GB 10ms 128k IDE DMA ... 259
M2954QYF 4GB 8ms 512k Ultra-Wide SCSI ... 519
M2949QYF 9GB 10ms 512k Ultra-Wide SCSI ... 899

IBM
*DCAS-32160 2GB 8.5ms UW-SCSI, 5400rpm ... *(199)*
*DCAS-34330 4.3GB 8.5ms UW-SCSI, 5400rpm ... *(295)*

KINGSTON
PCMCIA 260MB IDE, type III ... 375
PCMCIA 340MB IDE, type III ... 445

MAXTOR
8.4GB 10ms IDE Ultra-DMA ... 355

Quantum
SALE
(limit 1 per customer, while supplies last)
ST32100SE-S 2GB 10ms 128k SCSI-2 ... 209
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QM34320ST-S 4.3GB 10ms 128k Ultra SCSI ... 309
Atlas-2 4550W 4.5GB 8ms 512k UW-SCSI ... 499
*VK45W 4.5GB Wide SCSI (w. 5 yr warranty) ... *(419)*
ST36400SE-S 6.4GB 10ms 128k Ultra SCSI ... 389

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* 5 year warranty for below drives *
ST-32272N 2.2GB 9ms Ultra SCSI ... 349
ST-32272W 2.2GB 9ms Ultra-Wide SCSI ... 379
ST-34501W 4.5GB UW-SCSI, 10,000rpm ... 669
ST-34572N 4.5GB 9ms Ultra SCSI ... 539
ST-34572W 4.5GB 9ms Ultra-Wide SCSI ... 559
ST-19101N 9GB Ultra SCSI, 10,000rpm ... 1065
ST-19101W 9GB UW-SCSI, 10,000rpm ... 1095
ST-19171N 9GB Ultra SCSI ... 799
ST-19171W 9GB Ultra-Wide SCSI ... 825

TOSHIBA
PCMCIA 262MB IDE ... 425
MK2103MAV 2GB 13ms 128k IDE 2.5" ... 219
MK3205MAV 3.2GB 13ms 128k IDE 2.5" ... 315

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WD-23200 3.2GB 11ms 128k IDE 185

WD-12100 2.1GB 12ms 128k IDE Ultra-DMA 155
WDC-AC24300 4.3GB 9.5ms IDE Ultra-DMA 245
WDC-AC34300 4.3GB 11ms IDE Ultra-DMA 239
WDC-AC35100 5.1GB 11ms IDE Ultra-DMA 249
WDC-AC36400 6.4GB 11ms IDE Ultra-DMA 289

* 5 yr warranty for below drives *
WDC-E2170 2.17GB Ultra SCSI 349
WDC-E2170 2.17GB Ultra-Wide SCSI 379
*WDC-E4360 4.3GB Ultra SCSI ..... *(499)*
*WDC-E4360 4.3GB Ultra-Wide SCSI ..... *(515)*

REMOVABLE DRIVE:

iomega
Jaz Disk 1GB - Single / 3-pk / 5-pk 79/235/389
*Jaz Drive 1GB SCSI Int / Ext ..... *(275/369)*
Jaz Traveller 45
Zip Disk 100MB - Single / 3-pk 12.50/36
- 6-pk / 10-pk ..... 70/*(115)
*Zip Drive 100MB Parallel ..... *(135)*
Zip Drive 100MB IDE Int oem 95
Zip Drive 100MB SCSI Int oem / reg 125/145
*Zip Drive 100MB SCSI Ext ..... *(135)*
*Zip Drive 100 Plus (SCSI & Parallel) ..... *(185)*
Zip Zoom SCSI Accelerator Card for Ext 46

SYQUEST
Sparq 1GB IDE Int 199
SyJet 1.5GB IDE Int 279
SyJet 1.5GB Parallel 289
SyJet 1.5GB SCSI Int / Ext 279/289
1.5GB SyJet Cartridge 65

7. I/O CARD

ADDONICS (QUICKPATH)
Flexport 22EX 2S/ 2P/ 16650 95
Flexport 42 4S/ 2P/ Bi-Dir/ 16550 95

KOUWELL
KW508-E Single Parallel Port 12
KW524-J 2S/ 2P/ 16550 23

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SOCKET COMMUNICATION
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PCMCIA Dual Serial I/O 215

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8. KEYBOARD

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Microsoft
*Natural Keyboard oem ..... *(49)*

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SIIG
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W104 for Win'95 29
Wintouch 104 35

OTHERS
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BTC 5100 Mini 80 Key 29
EZ Key Natural Keyboard 28.50
MAXI 101 Key 25
*MITSUMI 104 Model ZW ..... *(14.50)*

9. MEMORY

DIMM
4 x 72 - 60ns, 168-pin (32MB) 149
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Unbuffer SDRAM 2 x 64 - 10ns (16MB) 39
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NOTEBOOK MEMORY (3RD PARTY)
for Acernote 374, Nuovo 971/ 972
- 8MB / 16MB / 32MB 95/145/499
for AST Ascentia 950N
- 8MB / 16MB 115/165
for AST Ascentia J30 / J50
- 8MB / 16MB / 32MB 85/139/258
for AST Ascentia P30/ P50
- 8MB / 16MB 115/175
for DEC HiNote 433/ 450/ 475
- 4MB / 8MB / 16MB 59/89/145
for HP Omnibook 5000/ 5500
- 8MB / 16MB / 32MB 109/165/285
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- 8MB / 16MB / 32MB 89/155/235
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- 4MB / 8MB / 16MB 89/109/165
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- 4MB / 8MB / 16MB / 24MB 65/89/135/195
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- 8MB / 16MB / 32MB 89/130/249
for Toshiba Portege 650/ 660CDT
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for Toshiba Tecra 710/ 720/ 730CDT
- 8MB / 16MB / 32MB 89/130/249
for Toshiba Satellite 430CDS/CDT/ 100/ 200CDS/CDT
- 8MB / 16MB / 32MB 89/130/249

PCMCIA FLASH RAM CARD
4MB / 8MB / 10MB / 16MB / 20MB 125/165/179/225/259

PRINTER MEMORY
for HP Deskjet 500/ 500C
- 256k 55
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for HP Laser 4+ / 4V / 5 / 5N / 5P / 5Si / 6P / 1600C
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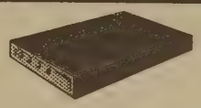
for Panasonic KX-P4400/ 5400
- 2MB / 4MB 75/99

10. MODEMS & FAX



APOLLO
PCMCIA 56k w. AT&T chips 135

BOCA SALE
(5-in-1 multimedia)
SE14SRS 14.4 Sound Expression Int ..... *(59)
SE34SRS 28.8 Sound Expression Int ..... *(99)

CREATIVE LABS
Modem Blaster Flash 56k Voice, Speaker Phone Int 125

DIAMOND
Supra Express 33.6 Fax PnP Int oem / reg 65/75
Supra Express 33.6 Fax PnP Ext 95
Supra Express 56k Fax PnP Int oem / reg 95/115
Supra Express 56k Fax PnP Ext 135

Hayes
*Accura 33.6 Fax Int / Ext ..... *(125/149)*
Accura 56k Int / Ext 159/179
Optima 33.6 v.34 Fax Int / Ext 189/199
*Optima 288 v.34 PCMCIA w. EZ jack ..... *(145)*
*PC288HC 28.8 v.34 Fax 230K DTE Int ..... *(195)*
*PC288MT 28.8 v.34 Fax Ext ..... *(149)*
*PM288HC 28.8 v.34 Int ..... *(69)*
PM336HC Int / PM336MT Ext 95/115
PM56HC Int / PM56MT Ext 145/165

JATON
Explorer 56k X2 Fax/ Voice/ Speaker Phone Int 79

MEGAHERTZ
*XJ1336 PCMCIA 33.6 Flash upgradable ..... *(175)*
*XJ1560 PCMCIA 56k ..... *(215) 224*
XJ4336M PCMCIA 33.6 cellular w. Motorola cable 249
XJ4336 Cellular Capable 33.6 225
*XJ5560 Cellular Capable 56k ..... *(235)*

MICROCOM
*Deskporte 28.8P v.34 Fax Ext Parallel ..... *(125)*
*Deskporte 28.8S v.34 Fax Ext ..... *(95)*
Officeporte 33.6 Voice ASVD Ext 155

MOTOROLA SALE
BitSerfer #1749 Pro ISDN Multilink PPP Ext ... *(299)
BitSerfer #1750 ISA ISDN ..... *(199)
BitSerfer #1994 Pro ISA for ISDN ..... *(298)
BitSerfer Pro ISDN Easy Ext ..... *(275)
Mobile Serfer 56k PCMCIA 169
Modem Serfer 33.6 Int / Ext ..... *(75/95)
Modem Serfer 56k Int / Ext ..... *(94/109)
Montana PCMCIA 33.6 ..... *(165)
- w. cellular cable ..... *(185)
NT1D Network Terminator 165
Online Serfer 28.8 Fax Int / Ext ..... *(65/69)
Premier 33.6 Int / Ext ..... *(149/169)
Voice Serfer 33.6 Int / Ext ..... *(99/115)

SIMPLY TECHNOLOGY
Communicator 56k PCMCIA Voice & Cellular 199

U.S.Robotics SALE
Courier I-Modem #U w. Analog Int / Ext 239/285
*Courier V. Everything 56k Int / Ext ..... *(199/225)*
*#839 Sportster v.34 33.6 Fax Ext ..... *(139)*
*#840 Sportster v.34 33.6 Fax Int oem / reg ..... *(89/99)*
#1171 Sportster v.34 33.6 Fax/ Voice/ Mail/ Speaker Phone Int oem / reg 99/115
#1172 Sportster v.34 33.6 Fax/ Voice/ Mail/ Speaker Phone Ext 149
#1786 Sportster 56k Ext 185
#1787 Sportster 56k Int oem / reg 145/165
#1784 Sportster 56k w. Voice Ext 195
#1785 Sportster 56k w. Voice Int 179
#9040 Sportster ISDN 128k Int 185

WISECOM SALE
(5 year warranty)
3314-JS3 33.6 Data Fax/ Voice Int (Rockwell) . 54
3314-JS7 33.6 Data Fax/ Voice Int (Davidcom) 49
5614-JS3 56k Data Fax/ Voice Int (Rockwell) .. 86
5614-WD8 56k X2 Data Fax/ Voice Int (TI) 84

XIRCOM
*CM-33 33.6 Fax PCMCIA ..... *(159)*
*CM-56G 56k PCMCIA Global Access ..... *(189)*

ZOOM (7 YR WARRANTY)
*#2805 33.6 Fax Int ..... *(95)*
*#2836 33.6 Fax Ext ..... *(105)*

11. MONITORS

Monitors on Display at our stores for your comparison

Acer
*78iE 17" 1600 x 1200 .26 NI ..... *(509)*

ARTMEDIA (SONY OEM)
*TX1664 15" 1280 x 1024 .25 NI ..... *(299)*
TN1885 17" 1600 x 1280 .25 NI 689
TX1864 17" 1280 x 1024 .25 NI 549
TN2185T 20" 1600 x 1200 .30 NI 1169
GT-960T 20" 1600 x 1200 .25 NI 1389

HITACHI SuperScan®
*CM500U 15" Flat 1280 x 1024 .28 NI, 65hz ..... *(289)*
CM620U 17" Flat 1280 x 1024 .28 NI 545
*CM630U 17" Flat 1600 x 1200 .28 NI ..... *(565)*
*CM751 19" 1600 x 1200 .26 NI, 75hz ..... *(985)*
*CM800U 21" 1600 x 1200 .22 NI ..... *(1329)*
CM802U 21" 1600 x 1200 .22 NI ..... *(1439)
*CM803U 21" 1800 x 1440 .22 NI, 77hz ..... *(1545)*

IBM
G41T 14" Touch Screen Monitor .28 895
G50T 15" Touch Screen Monitor .28 985
G70 17" 1280 x 1024 .28, 60hz, FST 785
G70T 17" Touch Screen Monitor .28 1465
P70 17" 1600 x 1200 .26, 60hz 995
G200 20" 1600 x 1200 .28, 60hz 1385
P200 20" 1600 x 1280 .31, 60hz 1785
P201 20" 1600 x 1200 .26mm, 85hz 2445

Hyundai SALE
(3 Year warranty)
MF-8515G 15" 1280 x 1024 .28 NI 285
MF-8617E 17" 1600 x 1200 .26 NI, 69hz 535
MT-9017E 17" 1600 x 1200 .25 NI, 72hz 625
MF-8721 21" 1800 x 1440 .22 NI, 74hz 1165
MT-9021E 21" 1600 x 1280 .30 NI, 76hz 1125
MT-9221E 21" 1800 x 1440 .28 NI, 74hz 1295
S-901GT 19" 1600 x 1200 .26mm NI 829

IMPRESSION
3 Plus 14" 1024 x 768 .28 NI 165
5 Plus 15" 1280 x 1024 .28 NI 215
7 Plus 17" 1280 x 1024 .28 NI 415
Vienna Pro 17" 1600 x 1280 .25 NI 559

KFC
*CA1515DS 15" Flat 1280 x 1024 .28 NI ..... *(225)*

MAG
*DX15T 15" 1280 x 1024 .25 NI ..... *(339)*
*DJ702 17" 1280 x 1024 .26 NI, 65hz ..... *(569)*
*DX700T 17" 1280 x 1024 .25 NI ..... *(619)*

NANAO
*FX-C5 17" 1280 x 1024 .26 NI ..... *(665)*
TX-C7S 17" 1600 x 1200 .25, Trinitron 999
TX-D7S 20" 1600 x 1280 .30 NI 1675
FX-E8 21" 1600 x 1280 .26 NI 2245

NEC
*A500 15" 1280 x 1024 .28 NI ..... *(275)*
E500 15" 1280 x 1024 .25 NI 345
*M500 15" 1280 x 1024 .25 NI ..... *(349)*
*A700 17" 1280 x 1024 .28 NI ..... *(525)*
E700 17" 1600 x 1280 .25 NI 669
*M700 17" 1280 x 1024 .25 NI ..... *(759)*
P750 17" 1600 x 1200 .25 NI 815
*E1100 21" 1600 x 1200 .28 NI ..... *(1265)*
*P1150 21" 1600 x 1200 .25 NI, 75hz ..... *(1399)*

**(sale price) ..... SPECIALS, limited to stock on hand*
Prices subject to change without notice.

http://www.centralcomputer.com for current prices & product catalog

- XM3750 37" 1024 x 768 Multimedia ... 5475
- XP3778 37" 1280 x 1024 Data ... 7795

NOKIA
- *447L 17" 1024 x 768 .28 NI ... *(549)*
- 447XAV 17" 1600 x 1280 .25 NI ... 715
- *447Xi 17" 1600 x 1280 .25 NI ... *(689)*
- 445XAV 21" 1600 x 1280 .26 NI ... 1845
- *445Xi 21" 1600 x 1200 .26 NI, TCO95 ... *(1425)*
- 445XPro 21" 1800 x 1440 .21 MP ... 1549

OPTIQUEST.
- V655 15" 1280 x 1024 .28 NI, Digital ... 329
- V775 17" 1600 x 1200 .26 NI ... 625
- V95 19" 1600 x 1280 .26 NI ... 785
- 2082DC 20" 1600 x 1200 .28 NI ... 1199

PRINCETON
- EO70 17" 1280 x 1024 .28 NI ... 435
- EO75 17" 1600 x 1280 .26 NI ... 549
- EO90 19" 1600 x 1200 .26 NI ... 799
- *Ultra 17+ 17" 1600 x 1280 .28 NI ... *(559)*
- AR2.7AV 29" 800 x 600, 38Khz max, video in w/ scan converter, speakers ... 949

RELISYS
- RE451 14" 1024 x 768 .28 NI ... 139

SCEPTRE
(3 Year Warranty)
- *P401 14" 1024 x 768 .28 NI, Digital ... *(165)*
- *P511 15" 1280 x 1024 .28 NI, Digital ... *(215)*
- P73 17" 1280 x 1024 .28 NI, Digital ... 419
- P73A 17" 1280 x 1024 .26 NI, Digital ... 465
- P73B 17" 1280 x 1024 .26 NI, Digital, Black ... 479
- *P75A 17" 1600 x 1200 .26 NI, Digital ... *(515)*

<u>LCD PANEL: (1 yr warranty)</u>
- CD-111S 11.3" DSTN, 800 x 600, 64k color ... 875
- CD-1112T 12.1" TFT, 800 x 600, 256k color ... 1725
- FT15 15" TFT, 1024 x 768, color ... 2499

SONY
- CPD-100ES 15" 1280 x 1024 .25 NI ... 339
- CPD-100GS 15" 1280 x 1024 .25 NI ... 369
- CPD-200ES 17" 1280 x 1024 .25 NI ... 625
- CPD-200GS 17" 1280 x 1024 .25 NI ... 679
- GDM-200PS 17" 1600 x 1280 .25 NI ... 829
- GDM-400PS 19" 1600 x 1280 .25 NI ... 1165
- *20SEII 20" 1600 x 1200 .25 NI ... *(1495)*
- *CPD-300SFT 20" 1280 x 1024 .30 NI, 80hz ... *(1149)*
- GDM-500PS 21" 1600 x 1200 .28 NI ... 1665

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- 9" 1024 x 768 VGA Mono ... 119

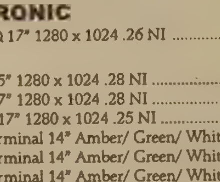
ViewSonic
- E641 14" 1024 x 768 .28 NI ... 195
- E655 15" 1024 x 768 .28 NI ... 265
- *15GA 15" 1280 x 1024 .28 NI, Speaker Phone ... *(365)*
- 15GS 15" 1024 x 768 .28 NI ... 295
- EA771 17" 1280 x 1024 .28 NI PnP ... 489
- G771 17" 1280 x 1024 .27 NI ... 455
- *P775 17" 1600 x 1280 .25 NI ... *(559)*
- *PT770 17" 1600 x 1280 .25 NI ... *(629)*
- PT775 17" 1600 x 1280 .25 NI, Sonictron ... 689
- *G800 20" 1600 x 1280 .28 NI ... *(999)*
- G810 21" 1600 x 1280 .25 NI ... 1129
- *P810 21" 1600 x 1280 .25 NI ... *(1119)*
- *P815 21" 1800 x 1440 .25 NI ... *(1265)*
- *PT813 21" 1600 x 1280 .28 NI ... *(1255)*
- *29GA 29" 1280 x 1024 .75 stripe pitch ... *(2195)*

VIEWTRONIC
- DX-1764Q 17" 1280 x 1024 .26 NI ... 419

WYSE
- WY-15E 15" 1280 x 1024 .28 NI ... 399
- WY-17E 17" 1280 x 1024 .28 NI ... 645
- WY-17PS 17" 1280 x 1024 .25 NI ... 825
- WY-55 Terminal 14" Amber/ Green/ White ... 275 ea.
- WY-60 Terminal 14" Amber/ Green/ White ... 385 ea.
- WY-65 Terminal 14" Amber/ Green/ White ... 345 ea.
- WY-150 Terminal 14" Amber/ Green/ White ... 325 ea.

<u>ACCESSORIES:</u>
- VGA Monitor Splitter - 4 Port / 8 Port ... 155/195
- VGA & Keyboard Switch 4 Way ... 19.95
- VGA, KB & Mouse Switch - 2 Way/ 4 Way 24.95/34.95
- VGA Switch 1 to 4 Way ... 13.95

12. MOTHERBOARDS



ASUS (W/O CPU)
- *P2L97 ATX, 440LX chipset ... *(175)*
- *P2L97S ATX, 440LX chipset, SCSI ... *(255)*
- P2L97DS ATX, Dual, 440LX chipset, SCSI ... 419
- TX97 512k, TX chipset, Dimm ... 139
- TX97E 512k, TX chipset, 4 Simm/ 2 Dimm ... 142
- TX97X ATX, 512k, TX chipset, Dimm ... 142
- TX97XE ATX, 512k, 4 Simm/ 2 Dimm ... 147
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- TXP4 512k, TX chipset, AT ... 125
- XP55T2P4 ATX, P-200, PCI, 512k Burst SRAM ... 139

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- 586ITB P-233, 512k, 430TX chipset ... 105
- 586ITX ATX, P-233, 512k, 430TX chipset ... 114
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- PA-2011 ATX, P-200, 512k, Via ... 117
- PT-2006 P-200, 512k, T3, IDE I/O ... 95
- PT-2007 P-200, 512k, TX, AT, IDE I/O ... 115
- PT-2011 ATX, P-200, 512k, TX, IDE I/O ... 119
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- GA586TX2 512k, 430TX, IDE I/O ... 115
- GA586ATX3 ATX, 512k, 430TX, IDE I/O ... 119
- GA686LX ATX, 440LX, IDE I/O ... 179

intel. (W/O CPU)
- Atlanta P-II, 512k, 440LX / w. Sound ... 195/215
- Atlanta P-II, 440LX, Sound, ATI Xpert@Work ... 359
- DK440LX P-II, Dual, Wide SCSI, Sound, WS ... 529
- R440LX P-II, Dual, Wide SCSI, Lan, VGA, Server .. 569

J-BOND (W/O CPU)
- *PCI500C-G2: P-200, 512k, 4PCI, EIDE, 430HX ... *(109)*
- *PCI500-H4: w. AHA-2940UW SCSI ... *(159)*
- PCI500C-J: ATX, P-300, CPU Alarm ... 129
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- PCI500CK: P-266, 512k, 430TX, USB ... 105
- - w. AHA-2940U SCSI ... 175
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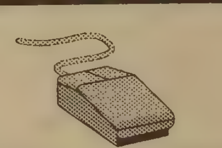
- Mustang R534E P-200, 512k, IDE I/O ... 115
- M549 512k, Super TX chipset, 4 Simm/ Dimm ... 85
- R539 512k, TX, 4 Simm/ 2 Dimm, IDE I/O ... 115
- R543 Cyrix Media GX, 150Mhz, VGA/ Audio ... 159
- R557 ATX, 512k, TX, 4 Simm/ 2 Dimm ... 125

SUPERMICRO (W/O CPU)
- P5MMA98 ATX, 512k, TX chipset ... 145
- P5MMS98 512k, TX chipset ... 139
- *P6DLS P-II, Dual, 440LX, w. 2940UW SCSI ... *(379)*
- P6SKEII ATX, P-II, 440FX, EIDE I/O ... 175
- P6SLA P-II, ATX, 440LX, EIDE I/O ... 199
- P6SNS Pro-200, w. 2940UW SCSI ... 259

TYAN (W/O CPU)
- 1564D Tomcat IV 512k, Dual, 430HX chipset ... 199
- 1564S Tomcat IV 512k, 430HX chipset ... 159
- 1571S 512k, 430TX chipset ... 127
- 1573S ATX, 512k, 430TX chipset ... 129
- 1680S P-II, 440FX, AT ... 179
- 1686S ATX, P-II, 440FX chipset ... 179
- 1692DL ATX, Tiger II Dual, 440LX ... 299
- 1692S ATX, Tiger II Single ... 195
- PS/2 Mouse Connector ... 6

13. MOUSE & JOYSTICK



CIRQUE (TOUCH PAD)
- *Easy Cat PnP ... *(25)* 29
- *Power Cat w. Signature Pen ... *(59)* 65
- *Smart Cat w. Scroll & Zoom ... *(39)* 44

IBM
- Black Scroll Mouse ... 68
- White Scroll Point Mouse ... 59

KENSINGTON
- Expert Bus 5.0 ... 115
- *Expert Serial & Trackball 5.0 ... *(79.99)*
- *Mouse in a Box ... *(26.95)*
- *Orbit Trackball ... *(49)*
- *Thinking Mouse Serial & PS/2 ... *(55)*

LOGITECH
- Coredless Mouseman Pro ... 57
- *First Mouse Plus oem ... *(24)*
- Mouseman Bus / Plus ... 64/52
- Mouseman Sensa ... 29
- Serial Combo PC & PS/2 oem / reg ... 24/45
- Trackman Live Cordless ... 125
- Trackman Marble for Win'95 oem / reg ... 59/82

Microsoft
- Bus 2.0 400dpi w. Bus Card oem / 5-pk ... 65/325
- Combo Mouse (Serial + PS/2) ... 49.95
- Easyball w. Freddi Fish CD ... 49.95
- Home Mouse Serial ... 29
- *IntelliMouse 3.0 for Win'95 ... *(69)*
- - oem Serial / oem PS/2 ... 35/37
- IntelliMouse Trackball ... 69.95
- PS/2 2.0 oem ... 32
- Serial 2.0 400dpi oem ... 27

MOUSE SYSTEMS
- Mouse! Serial w. pad ... 19
- Omni Mouse ... 26
- PC Mouse III (3-button optical) ... 49.50
- *PC Trackball II ... *(35)*
- ProAgio (5-button serial) ... 39
- Serial Bus Card (9IRQS), 5 Com ... 29

NEC
- *King Mouse 2-button ... *(16.50)*

QTRONIX
- Libra 90 Pro Trackball ... 35
- Opto-Mechanical Mouse ... 7.50

OTHERS
- AGILER ATB-610 Serial Trackball ... 19.95
- AGILER Bus ... 23
- ANCER 3-button, Black ... 19
- *ANTEC Serial ... *(6.95)*
- GENIUS Netmouse Serial / PS/2 ... 19.95/19.95
- GENIUS Netmouse Combo (Serial + PS/2) ... 24.95

<u>JOYSTICK:</u>

C.H. PRODUCTS
- Flight Stick Pro ... 53
- Pro Pedals ... 79.95
- Virtual Pilot / Pro (Yoke) ... 68/75

LOGITECH
- Wingman Extreme oem / reg ... *(34)/45

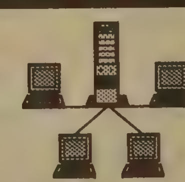
Microsoft
- Side Winder 1.0 ... 29
- Side Winder 3D Pro ... 44
- Side Winder Force Feedback ... 145
- Side Winder Gamepad ... 39
- Side Winder Precision Pro ... 68

QUICKSHOT
- QS123A Warrior 5 ... 12
- QS206 Sky Master ... 27
- QS216 Strato Warrior ... 25
- QS217 Command Pad ... 12

THRUSTMASTER
- ACM Game Card ... 29.95
- F-16 FLCS / F-16 TQS ... 125/129
- F-22 Pro Flight Control ... 139
- Flight Control System MKII ... 65
- Flight Control System Pro ... 108
- Formula T2 ... 119
- Rudder Control ... 109
- UPROM ... 29.95
- Weapon Control MKII ... 109
- Wizzard (pinball controller + Royal Flush CD) ... 39
- XL Action /- w. EF2000 CD game ... 28/33.95

OTHERS
- *Cobra (Mouse Systems) ... *(9.95)*
- Cyclone 3D ... 38
- PC Analog Pro ... 19.95
- PC Gamepad / Pro (10-button) ... 17/29

14. NETWORK



<u>Government & Education Pricing</u>
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3Com netWorking Partners ***Networking Partner***
- *3C250B 100BaseTX Fast 12 Port Hub ... *(845)*
- *3C509B TPO (RJ45 only) oem ... *(49)*
- 3C509B-TPC TP+BNC oem / reg ... *(69)/115
- 3C509B Combo / 5-pk ... 119/499
- 3C515-TX Fast 10/100 ISA oem / reg ... 129/145
- *3C562D PC Card Modem 33.6 + Lan TPO ... *(269)*
- *3C562D PC Card Modem 33.6 + Lan Combo ... *(299)*
- 3C575-TX 10/100 Card Bus PC Card ... 155
- 3C589D PCMCIA TP / 5-pk ... *(139)/675
- 3C589D PCMCIA Combo / 5-pk ... *(179)/875
- 3C597-TX EISA 10/100 TP ... 239
- *3C882 Impact IQ ISDN v.32bis Ext ... *(215)*
- 3C892 Office Connect ISDN Net Modem ... 389
- 3C900 PCI TPO ... 105
- 3C900 PCI Combo oem / reg ... *(89)/135
- *3C905-TX PCI 10/100 TP oem / reg ... *(75/99)*
- *3C16170 Link Builder 12 Port ... *(299)*
- *3C16405 Port Switch 40 Hub 12 Port ... *(395)*
- *3C16406 Port Switch 40 Hub 24 Port ... *(795)*
- 3C16590 Dual Speed Hub 12 Port ... 1165
- 3C16591 Dual Speed Hub 24 Port ... 1795
- *3C16670A Superstack II Hub 12 Port ... *(469)*
- *3C16671A Superstack II Hub 24 Port ... *(799)*
- *3C16700 TPO Office Connect Hub 8 Port ... *(95)*
- *3C16701 TPC Office Connect Hub (8TP+BNC) ... *(129)*
- *3C16702 Office Connect Hub (16TP+BNC) ... *(215)*
- *3C16703 Office Connect Hub 4TP Combo ... *(89)*
- *3C16704 Office Connect Hub 4TP ... *(69)*
- *3C16720 Office Connect 100 Hub 8 Port ... *(475)*
- *3C16730 Office Connect 10/100 Switch 4TP 1 Fast *(695)*
- *3C16900A Switch 1000 24 Port 1 Fast ... *(1595)*
- *3C16901A Switch 1000 12 Port 1 Fast ... *(1195)*
- *3C16941A Switch 3000TX 8 of 100TX Port ... *(1899)*

<u>NETSERVER:</u>
- *Netserver/8 Plus (#1877) ... *(2795)*
- *Netserver/8 I-Modem Plus (#1879) ... *(3495)*

adaptec
- *ANA-6901 PCI Full Duplex TP / Combo ... *(85/99)*
- ANA-6910TX PCI Fast-TX, 32-bit bus ... 175
- ANA-6940TX PCI Quartet Fast (4UTP) ... 745
- ATM 25.6Mb/s PCI - 128k / 512k ... 299/389
- ATM 155Mb/s PCI 512k UTP ... 725

ALLIED TELESYN
- 3012TR Workgroup Hub (12TP+AUI+BNC) ... 165
- 3016TR Workgroup Hub (16TP+AUI+BNC) ... 189
- 3024TR Workgroup Hub (24TP+AUI+BNC) ... 249
- MC12T UTP to BNC Conversion Kit ... 119
- *MR415T Mini Hub 4 Port ... *(49) 54*
- *MR815T Mini Hub 8 Port ... *(59) 64*
- MR820TR Microhub 8 Port (8TP+AUI+BNC) ... 115
- MX26F Fiber Optics Transceiver ... 145
- MX40F Fiber Optics Transceiver ... 139

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- PCMCIA LAN Ethernet Adapter Combo ... 79

ARTISOFT
- Extra Mail for Win'95 ... 215
- I-Share 2.5, 32 sessions (internet for Lantastic) ... 179
- Lantastic 7.0 Single - CD / FD ... 85/89
- Lantastic 7.0 10-user - CD / FD ... 355/359
- Lantastic 7.0 1-user Add On ... 129
- Lantastic 7.0 Starter Kit 2-user - CD+FD ... 249
- Lantastic 7.0 Unlimited User - CD ... 725
- Lantastic Power Suite:
- -1 / 5 / 10 / 25-user ... 149/599/1075/2295
- - conversion for 1 / 5 / 10-user ... 89/345/595
- NR-Pro 2000A Combo / 10-pk ... 85/755
- NR-Pro 2000T TP / 10-pk ... 79/625

ASANTÉ
- *10T Hub 8 Port (8TP+BNC) ... *(125)*
- *10T Hub 12 Port (12TP+1BNC+1AUI) ... *(219)*
- *10T Hub 24 Port ... *(315)*
- *Fast 100BaseTX 12 Port Hub, stackable ... *(1475)*
- *Fast 100BaseTX 12 Port Hub, PnP ... *(1195)*
- *FriendlyNet 5 Port Hub TP ... *(62)*
- FriendlyNet 8 Port Hub TP ... 69

ASCEND
- *P15-1UBRI: ISDN ... *(265)*
- *P25-1U-FX: ISDN Pipeline 25 + 4 Ethernet ... *(435)*
- *P25-1U-PX: ISDN Pipeline 25 + IP Routing ... *(499)*
- *P50-1UBRI: ISDN Pipeline 50 ... *(565)*
- - w. Secure Firewall P50 ... add 335
- *P75-1UBRI: ISDN Pipeline 75 ... *(635)*
- - w. Secure Firewall P75 ... add 335
- *P130-1UBRI-FT1: ISDN ... *(1245)*
- - w. Secure Firewall P130 ... add 645
- Max 200+ (M201 - 4BRIU) ... 2975
- *Max 1800 (MX18 - 8BRIU) ... *(4995)*

Bay Networks
- Bay Stack 12 Port (CG1001E01) ... 599
- Bay Stack 24 Port (CG1001E02) ... 975
- Bay Stack 100BT 12 Port (AT2202001) ... 1595
- Lattislink 2800A: 16TP + 1AUI ... 559
- Lattihub 2803: 16TP + 1AUI, stackable ... 599

**(sale price) ... SPECIALS, limited to stock on hand*
Prices subject to change without notice.

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NetGear FE108: 8 Port 100 Hub, non-stackable 375
NetGear FE508: 8 Port Fast 100 Hub 549
NetGear FE516: 16 Port Fast 100 Hub 685

CASTELLE

FaxPress 1500N Ether 1 Line for NW & NT 1995
Office Connect CD Rom Server 569
Office Connect Ether 2P Printer Server ..... *(299)
Office Connect Ether 1 Line Fax Server 1195

CHEYENNE

Arc Serve 6.1 for Win - 5 to 25-user (netware) ..... *(395)
Arc Serve 6.1 for Netware Enterprise 1095
Arc Serve 6.5 for Win NT 4.0 Single Server 415
Arc Serve 6.5 for Win NT 4.0 Enterprise 739
Arc Serve 6.5 for Win NT Workstation 99
Arc Serve for MAC - 5 / 20-user 159/309
Arc Solo Backup software for Dos / Win 119/118
Fax Server NLM 5.0:
- 5 / 10 / 25-user 355/639/999
Innocular for Netware Server 4.0 Unlimited ..... *(535)
Innocular for Win'95 (Anti-Virus) 45
Innocular for Win NT Server 575
Innocular for Win NT Workstation Client 46

CISCO SYSTEMS

CPA-762 ISDN BRI w. NT1 525
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J2585A 10/100 VG Selectable PCI 135
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J2591A Jet DirectEX Plus Combo ..... *(285)
J2592A Jet Direct 150X TPO 165
J2593A Jet DirectEX Plus 3 Combo 385
J2610B Advanced Stack 8 Port Hub 245
J3110A Jet Direct TP for 4000 249
J3111A Jet Direct Combo for 4000 295
J3128A Advanced Ethernet 8E Hub 185
J3175A AdvanceStack Switch 208T 1045
J3200A AdvanceStack Switching 12 Port 425
J3202A AdvanceStack Switching 24 Port 825

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Token Ring 16/4 Turbo ISA (72H3482) 245
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LANdesk Virus Protect 4.0 945
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PCLA 3151 Netport Express Pro Int 295
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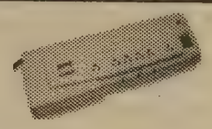

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BK-450 Back-UPS (325W), 4 out 165
BK-600 Back-UPS (425W), 4 out 225
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Turbo Cool 300 for Full Tower 125
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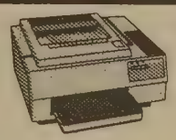

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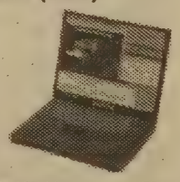

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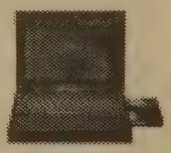
Libretto 70CT: P-120, 16MB, 1.58GB, 6.1" TFT, Win'95, Li-Ion 1999
Portege 300CT: P-133MMX, 32MB, 1.5GB, 10X CD, 33.6 modem, 10.4" TFT, Win'95 2485
- Multimedia Port Replicator (for 300CT) 435

*Portege 660CDT: P-150, 16MB, 1.35GB, 10X CD, 28.8 modem, 11.3" TFT ..... *(2035)*
Satellite 440CDX: P-133MMX, 16MB, 1.35GB, 10X CD, 12.1" FSCAN 1655
Satellite Pro 440CDT: P-133MMX, 16MB, 1.4GB, 10X CD, 12.1" TFT 1999
Satellite Pro 460CDT: P-166MMX, 32MB, 2.02GB, 10X CD, 33.6 modem, 12.1" TFT 2925
Satellite Pro 480CDT: P-233MMX, 32MB, 3.8GB, 10X CD, 33.6 modem, 12.1" TFT, Win'95 3925
Tecra 520CDT: P-166MMX, 32MB, 2GB, 10X CD, modem, 12.1" TFT, Win'95 2955
Tecra 530CDT: P-166MMX, 32MB, 2GB, 10X CD, modem, 12.1" TFT, XGA, Win'95 3150
Tecra 730XCDT: P-150MMX, 16MB, 2GB, 10X CD, 28.8 modem, 12.1" TFT, Win'95 2500
Tecra 740CDT: P-166MMX, 16MB, 3GB, 10X CD, 28.8 modem, 13.3" TFT 3250
Tecra 750CDM: P-233MMX, 32MB, 4.7GB, 20X CD, modem, 13.3" TFT, 4MB SGRAM, Win'95 5399
Tecra 750CDT: P-233MMX, 32MB, 4.7GB, 20X CD, modem, 13.3" TFT, XGA, Win'95 5199
Tecra 750DVD: P-233MMX, 32MB, 4.7GB, DVD Video, modem, 13.3" TFT, 4MB SGRAM, Win'95 5799

TWINHEAD



Slimnote 9166TZ:
P-166MMX, 32MB, 2.1GB, 10X CD, 33.6 modem, 12.1" TFT, Win'95, Li-Ion 2485
Slimnote 9T133CZ:
P-133, 16MB, 1.4GB, 20X CD, 12.1" DSTN, Win'95, Ni-MH 1535
Slimnote 9T166CZ: P-166, 16MB, 1.4GB, 20X CD, 12.1" DSTN, Win'95, Ni-MH 1595
Upgrades for 9T133CZ & 9T166CZ:
- 16MB RAM 89
- fr. 1.4GB to 2.1GB (w. purchase of notebook) 79

Slimnote EX200TG: P-200, 32MB, 2.1GB, 20X CD, 1024x768, 13.3" TFT, 4MB VGA, Win'95, Li-Ion . 2999
Slimnote EX233TG: P-233, 32MB, 2.1GB, 20X CD, 1024x768, 13.3" TFT, 4MB VGA, Win'95, Li-Ion . 3235

U.S. Robotics

*Palm Pilot Personal 512k ..... *(235)*
*Palm Pilot Professional 1MB ..... *(339)*
Accessories:
(10101U) Slim Leather Case 25
(10108U) Pen 3-pk 7.99
(10109U) Cradle for Windows 29
(10117U) Belt Crib Case 24
(10264U) Deluxe Leather Case 58

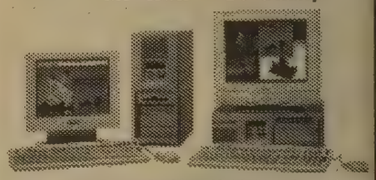
OTHERS

Kensington: Notebook Carrying Case 28.95
*Kensington: Saddle Bag - Brown ..... *(59.95)*
Kensington: Wet Suite for Palmtop 11.50
*Kensington Port: MicroSaver ..... *(35.95)*
Port: DEFCOM (motion sensor) 49
Targus: Leather Convertible Backpack (CLC-1) 89
*Targus: Notepad Case (CNO-1) ..... *(24.95)*
Targus: Notepad Plus (CNP-1) 45
Targus: Player Pad Case (23125) 49.95
Targus: Universal Carrying Case (CUN-1) 65
Targus: Universal APS Case (CUN-1A) 66

Workstations / Servers

HEWLETT PACKARD

• MT=Tower •DT=Desktop



Brio/MT (D5414A): P-166MMX, 16MB, 256k, 2.1GB, 16X, 56k modem, S3 Trio64 V2 1MB, Win'95 1360
Brio/MT (D5415A): P-200MMX, 32MB, 256k, 2.1GB, 24X, 56k modem, S3 Trio64 V2 1MB, Win'95 1585
Brio/MT (D5416A): P-233MMX, 32MB, 256k, 6GB, 24X, 56k modem, Matrox 4MB, Win'95 1925
Brio/MT (D5557A): P-200MMX, 32MB, 256k, 2.1GB, 16X CD, S3 Trio64 V2 1MB, Win'95 1385
Kayak XA/DT (D3990A): P-166MMX, 16MB, 512k, 2.5GB EIDE, 8X CD EIDE, Audio, Matrox 2MB, 10/100 NIC, Win'95 1615
Kayak XA/MT (D3994N): P-166MMX, 32MB, 512k, 2.5GB, 8X CD, Audio, Matrox 2MB, 10/100 NIC, Win NT Workstation 4.0 1915
Kayak XU/MT (D4691N): PII-266, 32MB, 512k, 2.1GB SCSI, 24X CD, Audio, Matrox AGP 4MB, 10/100 NIC, Win NT Workstation 4.0 3425
Kayak XW/MT (D5505N): PII-266, 128MB, 512k, 4.5GB SCSI, 24X CD, Audio, Accel Eclipse 32MB, 10/100NIC, Win NT Workstation 4.0 7399

NETSERVERS:
E40/MT (D4938A): Pro-180, 16MB, 256k, 2.1GB SCSI, 16X CD, 10/100 NIC 1999
E45/MT (D4974A): PII-233, 32MB, 512k, 4.2GB SCSI, 24X CD, 10/100 NIC 2415
E45/MT (D4976A): PII-266, 32MB, 512k, 4.2GB SCSI, 24X CD, 10/100 NIC 2765
LD Pro/MT (D4962A): Pro-200, 32MB, 256k, 2.1GB SCSI Hot-Swap, 12X CD, 10/100 NIC 3250
LH Pro/MT (D4841B): Pro-200, 32MB, 256k,12X 5859
- (D3582C): w. three 2.1GB UW-SCSI Hot-Swap RAID 1 Disk Mirroring ..... add 2307

IBM

MPro3D-Z6U IntelliStation: PII-266, 128MB, 512k, 16X CD, 4.3GB UW-SCSI, Audio, 10/100 NIC, Win NT ... 5599
PC300GL-63U: P200, 32MB, 2.5GB, Win'95 1340
PC300GL-86U: P-233MMX, 32MB, 2.5GB, Win'95 1455
PC300PL-12U: P-200MMX, 32MB, 4.2GB, 24X CD, Win'95 1725
PC300PL-16U: P-166MMX, 32MB, 2.5GB, Win'95 1329
PC300PL-50U: P-233MMX, 32MB, 4.3GB, 24X CD, Win NT 2365
PC300XL-10U: P-233MMX, 32MB, 2.5GB, 16X CD, Win NT 2045
ZPro3D-14U IntelliStation: Pro-200, 64MB, 256k, 16X CD, 4.5GB UW-SCSI, Audio, 10/100 NIC, Win NT ... 4125

SERVERS (w/o OS):
315-PSW: Pro-200, 32MB, 4.3GB UWSCSI 2675
325-PTW: PII-233, 32MB, 4.5GB UWSCSI 3685

TOSHIBA

• D=Desktop • M=Tower

Equium 5160D: P-166MMX, 32MB, 2GB, 12X CD, Win'95, 10/100 NIC 1335
Equium 5200D: P-200MMX, 32MB, 2.5GB, 12X CD, Win'95, 10/100 NIC 1400
Equium 6230D: PII-233, 32MB, 3GB, 24X CD, Win NT, 10/100 NIC 1925
Equium 6260M: PII-266, 32MB, 4GB, 16X CD, Win NT, 10/100 NIC 2155

NO Returns, Only Satisfaction Warranty from Manufacturers.

*(sale price) ..... SPECIALS, limited to stock on hand
Prices subject to change without notice.*

http://www.centralcomputer.com for current prices & product catalog

HP Ink Cartridges:

51625A: Color for 500C/ 550C/ 560C 26.95
51626A: Black for 500/ 540/ 560 ..... 24.45
51629A: Black for 600/ 660 ..... 24.95
51640A: Black for 1200C 23.95
51640C: Cyan for 1200C 27.95
51640M: Magenta for 1200C 27.95
51640Y: Yellow for 1200C 27.95
51641A: Color for 870C/ 855C/ 1600C 28.95
51645A: Black for 870C/ 855C/ 1600C 26.95
51649A: Color for 660C 29.25
C3102A: Cyan for Color Laser Jet 32.95
C3103A: Yellow for Color Laser Jet 32.95
C3104A: Magenta for Color Laser Jet 32.95
C3105A: Black for Color Laser Jet 7.95
*C3067A: Color for 540 ..... *(37)*
*C4533A: Color for 600 ..... *(39)*

HP Paper:

92296T: Transparency Film for Laser Jet, Letter, 50 sheet 17.95
C1812A: Greeting Card, Letter, 20 sheet 7.95
C1846A: Photo Paper, Letter, 20 sheet 9.95
C2974A: Glossy, Letter, for 5/ 5M, 50 sheet 39.95
C3850A: Opaque Bond, 36"x150' roll 24.95
C3877A: Coated Paper, 36"x150' roll 39.95
C5973A: Premium Glossy, Letter, 25 sheet 21.95
C5976A: Bright White Inkjet, Letter, 200 sheet 5.95
C6093A: Premium Photo 4"x5", 15 sheet 8.50

HP Toner Cartridges:

92274A: for 4L/ 4ML/ 4P 65
92275A: for IIP/ IIP+/ IIIP 74
92291A: for IIISi/ 4Si/ 4SiMX 129
92295A: for II/ IID/ III/ IIID 75
92298A: for 4/ 4M/ 4+/ 4M+/ 5/ 5M/ 5N 89
C3900A: for 4V/ 4MV 139
C3903A: for 5P/ 5MP/ 6P/ 6MP 75
C3906A: for 5L/ 5ML/ 6L 59
C3909A: for 5Si/ 5SiMX 179
C4127A: for 4000 ..... 89.95
C4127X: Extra Toner for 4000 129

IBM (NETWORK PRINTER)

#4312001: Laser, 600dpi, 4MB, 12ppm 1025
#4317001: Laser, 600dpi, 4MB, 17ppm 1365
#4324001: Laser, 600dpi, 4MB, 24ppm 2345

LEXMARK

Optra C Color, 600dpi, Postscript, 8MB, 3ppm 4495
Optra E 600dpi, 1MB, 6ppm 395
Optra S1250 1200dpi, 4MB, 12ppm 1045
*- with LAN (S1250N) ..... *(1245) 1299*
Optra S1650 1200dpi, 4MB, 16ppm 1295
- with LAN (S1650N) 1545
Optra S2450 1200dpi, 4MB, 24ppm, 11x17 2295
- with LAN (S2450N) 2595

NEC

Superscript 860 Laser 389

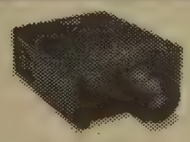
OKIDATA SALE

ML184T 9-pin, Par, 300cps, max. 5 copies 235
*ML320T 9-pin, 290cps, max. 5 copies ..... *(315)*
ML390T 24-pin, 312cps, for Win & Win 32 345
*ML520 9-pin, 430cps ..... *(385)*
ML590 24-pin, 450cps, max. 5 copies 449
ML591 24-pin, Wide, max. 5 copies 625
*Office 44 4-in-1 ..... *(495)*
*OkiPage 4W Laser, 4ppm ..... *(199)*
*OkiPage 6E 600dpi, 6ppm ..... *(289)*
*OkiPage 6EX 600dpi, 2MB, 6ppm ..... *(399)*
OkiPage 16N Laser, 600dpi, 16ppm 889
*OL600E Laser, 600dpi, 6ppm ..... *(295)*
*OL810E Laser, 600x1200dpi, 8ppm ..... *(565)*
*OL1200 Laser, 600dpi, 2MB, 12ppm ..... *(949)*

SEIKO

Smart Label Printer EZ30 145
Smart Label Printer Pro 235
Standard Label (2 rolls) 7.95

17. PROJECTOR



3M

Overhead M9100 AJB 289
Overhead M9200 AJC 399
Overhead M9550 AJH 615
Overhead M9700 AJJ 499

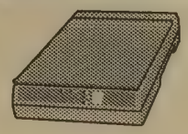
NEC

Projectors ..... Call

PROXIMA

Desktop DP5100 LCD 3499
Desktop DP5500 LCD 640x480, Zoom 4599
Ovation 810 8.4" LCD, 2M color, 640x480 1665
Ovation 944 10.4" LCD, 16.7M, 1280x1024 6395
Ovation+ 840 8.4" LCD, 16.7M, 800x600 2195
Ovation+ 846 10.4" LCD, 16.7M, 800x600 2695
Portable Overhead A653 3000 Lumens 475
Portable Overhead A655 4000 Lumens 799

18. SCANNER



ACER

*AcerScan 310S 30-bit ..... *(135)*

COMMAX

Imager 730 30-bit 960dpi Parallel Port 109

EPSON

Expression 636 Executive 725
Perfection 600 235

HEWLETT PACKARD

*ScanJet 6100 (C6267A) ..... *(699) 745*
*- Auto Document Feeder (C6265A) ..... *(455)*
- Transparency (C6261A) *599*
*ScanJet 5P ..... *(275)*
*ScanJet Office 4P + ADF (C4135A) ..... *(595)*
ScanJet Personal 5S 195

MICROTEK

*Scan Maker III w. TMA & Photoshop OCR ..... *(1399)*
*Scan Maker E3+ 600dpi, 24-bit color, OCR ..... *(135)*
*Scan Maker E6 1200dpi, OCR ..... *(269)*
Scan Maker E6Pro 1200dpi, Photoshop COR 499
Scan Maker V310 Parallel 145
Slide Maker 35T+ 1800dpi, 16.8M color 725
Auto Document Feeder ADF600 365
Color Pagewiz for Win, 24-bit 159
Transparency Adapter for E3 / E6 ..... 285/285

STORM TECH

*Easy Photo Reader Parallel ..... *(115)*
*Easy Photo Smart Page ..... *(149)*

UMAX

*Astra 610P Win ..... *(139)*
*Astra 610S Photo Deluxe ..... *(149)*
*Astra 1200S Win Deluxe ..... *(249)*
*Astra 1200S Win Photoshop ..... *(445)*

VISIONEER

Paperport Deluxe for Win 32 (software) *69.95*

19. TAPE BACKUP

AIWA

GD-B8000 8GB DDS-2 4mm SCSI Int 649
TD-S3200 TR-3 3.2GB Int 145

EXABYTE

*Eagle TR3 603003-004 3.2GB Int ..... *(145)*
EXB-8700LT 8mm 5-10GB Ext Drive 675
- with Arc Serve 899
Eliant 820S 8mm 7-14GB, Single Ended Int 1525
- Ext 1775
Mammoth 8900SL 8mm 20-40GB Int / Ext 2995/3245
210RK Automated 8mm Library (70-140GB) 6095

HEWLETT PACKARD

*C4534 4mm Dat. 2GB SCSI Int Drive ..... *(549)*
- w. Int Kit (C1525) / Ext Kit (C1520) 725/845
*C1536 4mm Dat. 2-4GB SCSI Int Drive ..... *(579)*
- w. Int Kit (C1526) / Ext Kit (C1521) 769/895
C1549A Surestore DLT 30GB Ext 3095
C1554 Dat. 24GB DDS-3 Int 1045
- w. Int Kit (C1555) / Ext Kit (C1556) 1399/1545
C1599 Dat. 8GB DDS-2 Int 765
- w. Int Kit (C1528) / Ext Kit (C1529) 965/1095
C5644B Surestore T4i 4GB Int 359
C5645A Surestore T4e 4GB Ext 459
C5648A Dat. 24GB x 6 Int Autoloader 2595
Mounting Frame 5.25" for C1533/ C1554 ..... 27 ea.
Mounting Frame 5.25" for C1534/ C1536/ C1599 ..... 25 ea.

iomega

2GB Tape - Single / 3-pk 19.95/57
Ditto 3200MB (QIC 3010/3020) Int 139
Ditto 3200MB (QIC 3010/3020) Parallel w. cart 239

NOVASTOR

*Novaback 4-in-1 for Win'95 & NT - FD ..... *(55)*
Novaback 5.0 for Win'95 & NT - CD 54

Seagate SALE

*CNR-4324RP 2-4GB SCSI Int 5.25" ..... *(499)*
*CNR-4326RP 8GB 4mm SCSI w. 5.25" rail ..... *(665)*
Tape Stor 420MB w. cartridge Int 139
Tape Stor 800MB Travan w. cartridge Int 139

Software (Arcada):

Back Up for Win'95 65
Back Up Exec for Netware Workstation 7.0 98
Back Up Exec for Netware Enterprise 7.11 845
Back Up Exec for Netware Server 7.5 435
*Back Up Exec for Netware 4 Server 25-user ..... *(289)*
Back Up Exec for Win NT Workstation 189
Back Up Exec for Win NT Enterprise 7.0 839
*Back Up Exec for Win NT Server 7.0 ..... *(399)*

SONY

LanBacker 7000: 8GB DDS-2 w. ArcServe Serve Int / Ext 1095/1175
WanBacker 7000: 8GB DDS-2 w. ArcServe Enterprise Int / Ext 1695/1795
WanBacker 9000: 24GB DDS-3 w. ArcServe Enterprise Int / Ext 2150/2175

OTHERS

COMBYTE: DP1800EA 800MB Int 135

TAPE CARTRIDGES:

3M - 4mm 90M 7.50
- 8mm 112M 6.95
- MC3000XL (680MB) 26.50
- Travan TR-1 (800MB) 24.95
- Travan TR-3 (1600MB) 29.95
- Travan TR-4 (1600MB) 31.95
EXABYTE - 8mm 112M, 5GB 9.95
- 8mm 160MXL (for XL drives) 15.95
- 18C 8mm Cleaning Cartridge 19.95
- EXMC3000XL (1GB) 26.95
- MC3000XL (680MB) 21.95
HP - 92283B: 4mm 90M (2GB) / 5-pk 7.50/35
- 92283K: 4mm Cleaning Tape 2-pk 21.95
- 92300A: 4mm 120M (4GB) / 5-pk 12.95/59
- C1517A: 4mm 125M DDS-3 (12GB) 27.99
- C1572A: 4mm 120M Autoloader 119
- Travan for DT-1000 / 2-pk / 3-pk .. 29.95/54.95/82
*MAXELL - 4mm 90M Dat. ..... *(7.99)*
- DC2120 (QIC80) 9.95
- DC2120XL (350MB) 16.95
SONY - 4mm 120M for DDS-2 ..... 15.95
- 4mm 90M for DDS-1 ..... 7.95
- 4mm 125M for DDS-3 ..... 28.95

20. VGA CARDS

ATI

*All-in-1 Wonder 4MB PCI ..... *(215)*
All-in-1 Wonder Pro 4MB PCI 269
Xpert@Play 4MB AGP oem 185
Xpert@Play 4MB PCI 189
Xpert@Play 8MB PCI 239
Xpert@Work 4MB AGP oem 175
Xpert@Work 4MB PCI 175
Xpert@Work 8MB PCI 229

ASUS

V3000 4MB AGP 149

DIAMOND

*Fire GL 1000 Pro 8MB AGP oem ..... *(209)*
*Fire GL 1000 Pro 8MB PCI oem ..... *(199)*
Monster 3D 4MB PCI oem / reg 169/189
Stealth 3D 3000XL 4MB PCI oem / reg 165/185
Stealth 3D Pro + TV, 4MB PCI reg 149
Stealth II 3D 4MB PCI oem 109
Stealth 2500 DRAM PCI w. 1MB / 2MB 45/59
Stealth Video 64 2MB VRAM PCI oem 99
- 2MB upgrade 49
Viper V330 4MB AGP oem / reg ..... *(175)/189
Viper V330 4MB PCI oem / reg ..... *(175)/189

HERCULES

*Stingray 128 3D 8MB EDO reg ..... *(249)*

IMS

Twinturbo 128P VRAM PCI 2MB 195
Twinturbo 128P VRAM 4MB PCI 265
Twinturbo 128P VRAM 8MB PCI 395

LEADTEK

WinFast 3D L2300 8MB AGP 249
WinFast 3D L2300 8MB PCI 229

matrox

Millennium II 4MB AGP oem 185
Millennium II 4MB PCI oem 175
Millennium II 4MB PCI reg 195
Millennium II 8MB AGP oem 265
*Millennium II 8MB PCI oem / reg ..... *(255/285)*
Mystique 220 2MB PCI reg 109
Mystique 220 4MB PCI oem / reg 119/139
Rainbow Runner Studio (upgrd for Mystique) 189
Rainbow Runner Television 89
M3D 4MB upgrade 95
Memory Upgrade (for Millennium II):
- 4MB / 8MB / 12MB 129/195/279
Video, Graphics & TV Combo Kit 325

NUMBER NINE

*Imagine 128 Series II 4MB EDO PCI ..... *(189)*
*Revolution 3D 128 4MB AGP oem / PCI oem (purchase w. systems) ..... *(199/199)*
Revolution 3D 128 4MB AGP reg 239
Revolution 3D 128 4MB PCI reg 239
*Revolution 3D 128 8MB AGP oem / PCI oem (purchase w. systems) ..... *(259/259)*
Revolution 3D 128 8MB AGP reg 315
Revolution 3D 128 8MB PCI reg 315
4MB Memory Upgrade (for Revolution) 159

OTHERS

Boca Voyage Movie Player Accelerator 285
Canopus Pure 3D 6MB 189
InterGraph Intense 3D Voodoo 6MB 225
Movie Plus 1100 MPEG Decoder 199
STB Velocity 128 AGP (no TV), boxed oem 139
Televiewer for Win 3.11 & '95 only 89
Televiewer Plus for Win 3.11 & '95 only 145
Trident 8900 1MB ISA 45
Trident 9680 1MB PCI 39
Tvator Pro PC/Mac VGA to NTSC Scan Converter 119
Tvator Remote Pro VGA to NTSC Scan Converter 289

21. VIDEO / DIGITAL CAMERA

AGFA

*Ephoto 307 Digital Camera ..... *(295)*
Ephoto 1280 859

BEST DATA

Digital Color Camera DDC-100 125
Digital Color HCC-100 w. Photo Edit 199

Canon

Powershot 350 LCD 475
Powershot 600 LCD 675

CASIO

QV-11 Digital Camera 285
QV-200 Digital Camera 399
QV-300 Digital Camera 665

EPSON

Photo PC Color Digital Camera 245
Photo PC-500 Digital Camera 345
*- w. Photo Pix LCD Monitor ..... *(459)*
Photo PC-550 285
*Photo PC-600 1024x768 ..... *(715)*

Kodak

*DC20 Digital Camera ..... *(175)*
*DC25 Digital Camera ..... *(245)*
*DC50 Digital Camera Zoom Lens ..... *(465)*
DC120 Camera 1.6" Color 735
DC210 Zoom Camera 839
DVC300 Video Camera 149

OLMPUS

D220L 640x480 475
D320L 1024x768 675
D600L 1280x1024, 3X Zoom 1195

SONY

DSC-F1 Digital Still 495
Mavica MVCFD-5 Digital Camera 489
Mavica MVCFD-7 w. Zoom 685

UMAX

Photorun Digital Camera DT for Win'95 239
Photorun Digital Camera LP for Win'95 199

U.S.Robotics

Big Picture Camera + Capture 195
Big Picture Video (capture + modem) 189
Big Picture Video Kit + Camera 299

OTHERS

Howard Video Camera 295
Intel Smart Video Recorder III 189
Internet Videophone + Video Capture 135
Panasonic KXL-600A Digital Camera 225
Quick Cam for Win 99
Quick Cam 2 Color 225
Quick Cam VC (parallel) 119
*Snappy 2.0 ..... *(135)*
Specom Suite Visions (digital camera + s/w) 195
V-Mate Pro (video encorder PC to TV) 189
Video Logic Captivator 135

**(sale price) ..... SPECIALS, limited to stock on hand*
Prices subject to change without notice.

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SOFTWARE

PC SOFTWARE

Adobe
Acrobat 3.0.1 ... 189
Acrobat Capture 2.0 ... 559
FrameMakr 5.5 / upgrade ... 745/165
Illustrator 7.0 for Win 32 ... 365
- competitive upgrade ... 265
PageMaker 6.5 for Win 32 / (special) ... 545/*(295)
Photoshop 4.0 / (special) ... 549/*(399)
Premier 4.2 for Win / (special) ... 499/*(299)

AUTODESK
AutoCAD Lite '97 ... 405
Autosketch 2.1 for Win & Win'95 ... 89
Symbols '97 ... 87

BORLAND
C++ 5.0 for Dos, Win & Win 32 - CD ... 325
C++ 5.0 Developer Suite ... 425
C++ Builder 1.0 Standard / Professional ... 89/525
Delphi Developer 2 Kit / upgrade ... *(395/255)
Delphi 3 / upgrade ... 499/249
Paradox 5.0 for Win ... *(99)
Paradox 7.0 for Win'95 & NT ... 265
Turbo Assembly 5.0 for Win'95 ... 115
Visual dBase 5.5 for Win & Win'95 ... 269

COREL
Corel Draw 4.0 (2CD) ... 69
Corel Draw 5.0 for Win 3.11 - CD ... *(195)
Corel Draw 6.0 for Win'95 - CD ... *(199)
Corel Draw 7.0 for Win'95 & NT ... *(399)
Corel Draw 8 - CD / upgrade ... 425/225
Corel Flow / Corel Flow 3 ... *(59)/129
Corel XARA ... 179
Lumiere Suite ... 69
Ventura 7 for Win'95 - CD ... 549
Wordperfect Suite 8.0 for Win'95 ... 285

DELRINA
Comm Server ... *(39)
Comm Suite 2.1 ... *(65)
Cyberjack 7 for Win'95 ... *(29)
WinFax Pro 4.4 for Network 10-user ... *(499)

IBM
Anti-Virus Desktop 2.52 oem ... 24
OS/2 Warp 4.0 Single - WS / Server ... 195/539
Via Voice for Win 32 ... 89
Via Voice Gold for Win 32 ... 138

INTUIT
Quick Basic '98 ... 45
Quicken 6.0 ... *(35)
Quicken Deluxe '98 - CD ... 59.95
Quicken Family Lawyer - CD ... *(39)
Quicken Financial Suite '98 oem / reg ... 33/86.95
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LOTUS
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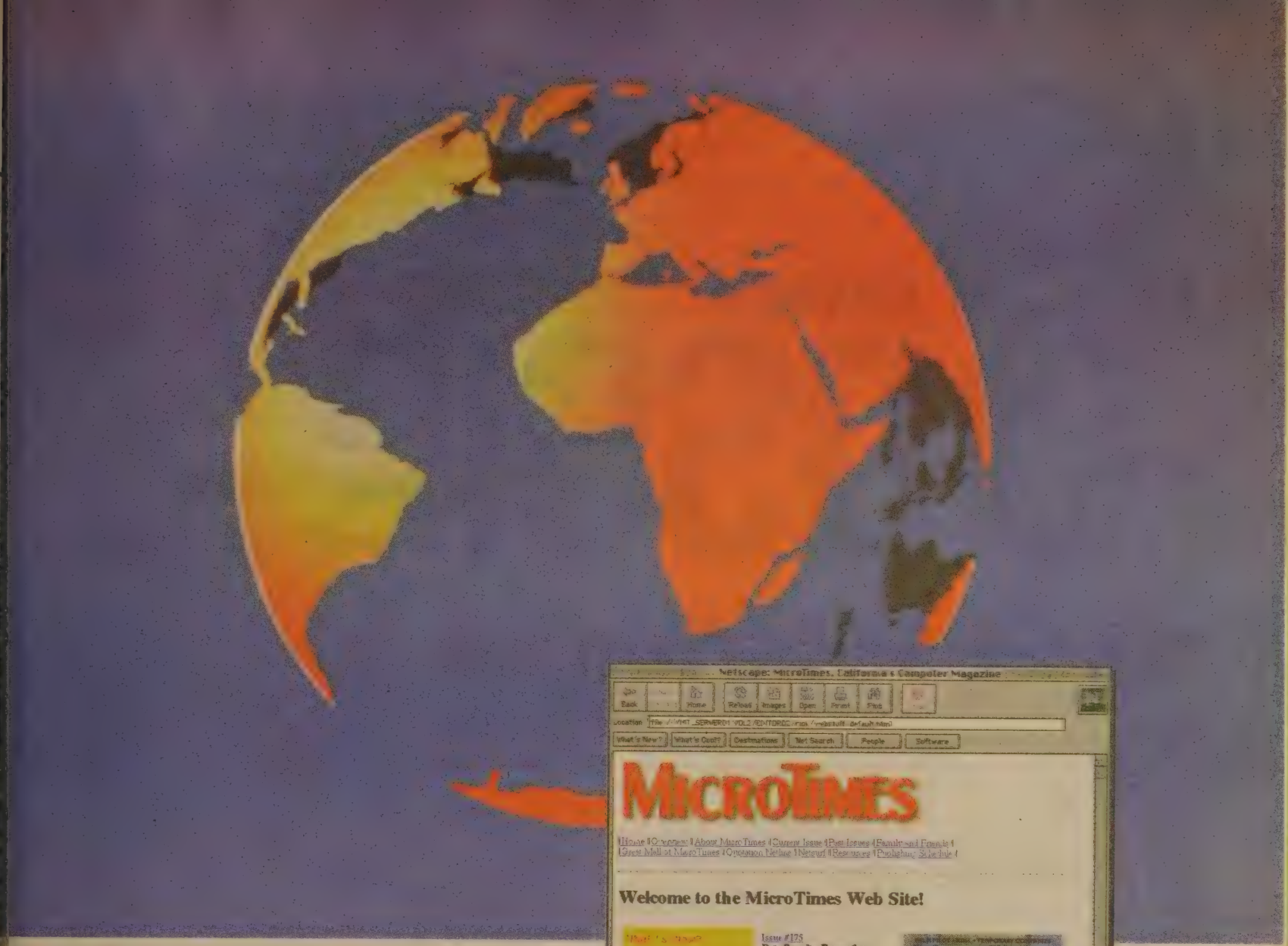

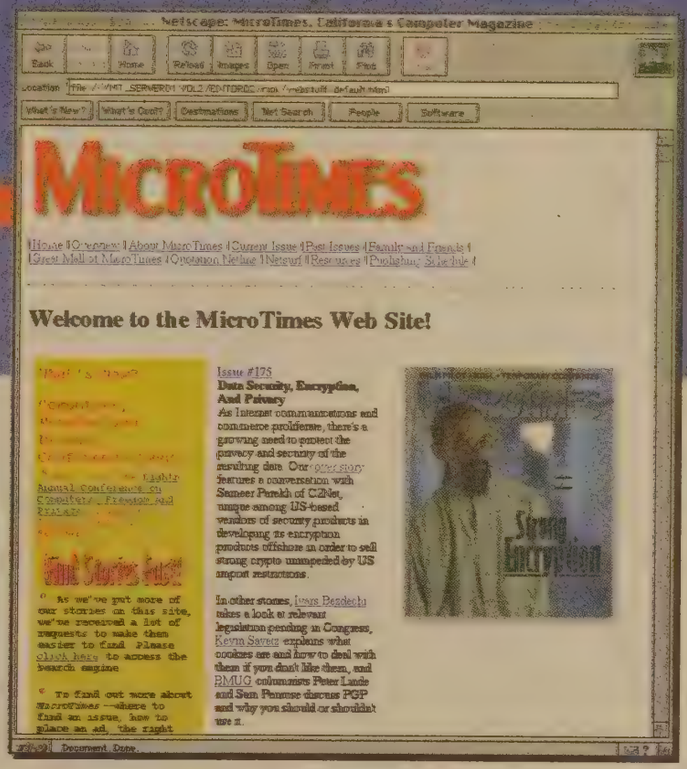

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Gulch Gossip

by Jonathan E.

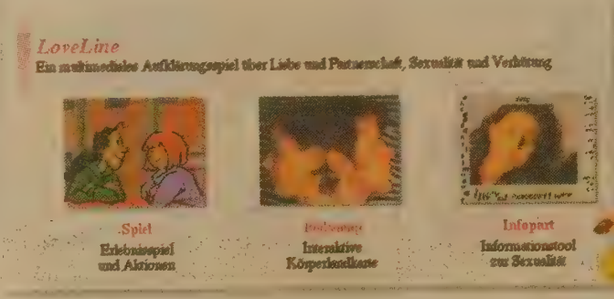
Good Government

Hal Josephson, executive director of the **Invision Awards Festival**, thought I trashed San Francisco Supervisor **Leslie A. Katz** overly heavily in last month's Gulch Gossip. He points out that "she is the most responsive person in SF government, trying to pay attention to what is going on in this arena, certainly supportive, and in fact quite open to input."

Well, perhaps I was a little unkind, but politicians as a class in this country often deserve such rough treatment. A major reason for my disdain is their craven kowtowing to some of the most inane and ignorant elements of the American electorate.

One thing that struck me at the Festival's International Showcase (but that I forgot to mention last month) was that two of the titles subsidized by their respective governments were very frank and even saucy sex-related works. The German sex-education CD-ROM, ***LoveLine—Eine multimediale Aufklärung***, displayed the German passion for organization with detailed and full advice on how to behave in sexual situations along with depictions of sexual organs that you could click on for further info. There was none of this namby-pamby cringing before the religious right with its unrealistic demands to reduce the choices to a "just-say-no" situation; none of this unhealthy American obsession with keeping the sight of sex organs away from those dealing with puberty—not only could you look but you could click!

The Australian CD-ROM/Web site, **Geekgirl—The World's First Cyberfeminist**, was not as earnest—but it was similarly upfront, or perhaps in this case, I mean downback. Anyway, earnestness really doesn't enter the picture when the picture is one of a good-sized and tightly-framed, full-screen pair of buttocks that you're invited to virtually tattoo in any way that delights you. Okay, I wouldn't call this high art, but the Australian Council for the Arts finds it worthy of support. Note that it was only one small part of the entire project.



Both of these titles will obviously be challenging to some segments of almost any population, but both also express values that need to be in the public arena, although they are likely not commercially viable. However, I cannot imagine either receiving any sort of public support in the now-desiccated cultural climate of the United States.

Only a few short years ago, this country had not been beaten stupid by an unholy alliance of libertarians, Christian fundamentalists, a couple of reactionary old-codger senators from tobacco states, along with a few greedy bastards who delude themselves into believing that they should keep all of their wealth while the rest of humanity goes to hell, who deny that they too fed at the public trough on their way up. There was an organization known as the **National Endowment for the Arts** that provided Americans with art and American artists with sustenance. An incredibly small portion of that art provoked enormous uproar that, together with the know-nothing public attitude towards taxes endemic to this once-great country, resulted in the total dismantling of public support of the arts. Do you have any idea of how primitive and unsophisticated this appears to any other developed country, and even to many undeveloped ones?

In this month's Multimedia 101 column, **Randall Packer**, director of multimedia at the San Jose Museum of Art, goes on and on about how he hopes to get support from the wealthy corporations of Silicon Valley. I hope he gets it, it'll be better than nothing. However, it's incredibly sad that he has to go cap in hand to these corporate underwriters as a major source of funding. Do you think they'll sponsor any work that asks serious questions about the results of the onslaught of digital technology? Is it likely that an industry notorious for poor labor and environmental practices, an industry that almost by reflex promises consumers far more than it actually delivers, will suddenly wake up with a social conscience? Will an industry so addicted to rapid

change even be able to provide consistent support, especially considering the amazingly rapid downward changes possible in a company's paper value?

The truth is that there are roles for government; funding for the arts is one of them. Unfortunately, this country has been so poorly served by its government for so long that no one trusts the mostly self-serving fools that seek election.

I hope that Leslie A. Katz is open to this input, ignores my rude remarks of last month, and does something about providing public support to the arts or even sex education—not just the industry. If countries such as Germany and Australia can manage it, I don't see why it should be so difficult for the United States.

If you're interested in either the German or the Australian experience, head over to *http://www.fox-lightware.de* or *http://www.geekgirl.com.au* for further enlightenment.

Waiter! There's A Burst Bubble In My Soup!

CRAIG'S LIST, *WWW.CNEWMARK.COM* , RECEIVED A BRIEF SPURT OF mainstream publicity around the time of its famous party, with many words spieled about its community-building aspects. It's true that plenty of new-media jobs pass through its server, but a closer look at some of those jobs and the fundamentals behind Craig's List reveal that behind the facade all is not well in the new-media community, that indeed some bubbles are already burst while others need popping before they get too big.

Firstly, consider that some portion of the jobs offer little more than digital sweatshop conditions. Most obvious was the listing for a writer to provide Web site reviews for $3 each, not only to provide them but also to find 600 Web sites worthy of review. Clearly the whole concept of amassing Web site reviews is already pretty tired and the posters of that job "opportunity" lack imagination (and probably a viable business plan), but the level of exploitation they were attempting to sink to left this writer gasping. Ultimately, this exploitation would affect not only the writer but any audience that happened to look in upon the resulting words. Is there any possibility of getting reasonably accurate and honest impressions of any site worth looking at for more than thirty seconds at $3 per review? I think not. Most likely these posters were just clueless and greedy late-arriving entrepreneurial schmucks—and that audience will never develop, although the chance that in the meantime some poor sucker of a writer, or perhaps a merely desperate one, will subject him- or herself to the treadmill leaves me appalled.

Another case illuminates more fully the difficulties workers currently face in the new-media industry. This time, **Cardinal Communications**, a real business with Financial District offices, offered $10 per hour on a contract basis for someone to do the following duties: "Updating and maintaining existing client Web sites, beta testing Web applications and client sites, scanning and digital editing, formating images and text, and may expand to include Web site design in the future." But what was quite mind-blowing was the "Experience Required: Ability to code HTML and HTML tables/frames manually, in-depth Photoshop knowledge, experience with Pagemill, Netscape and cross-platform and compatibility issues. You will be using a Macintosh, so at least 2 years of Macintosh experience is required."

Any contractor with any experience knows that $10 per hour is an absolutely unsustainable rate for virtually any occupation, especially when it comes around to tax time and that nasty self-employment tax raises its ugly 15% head; it's barely a living wage in San Francisco even with full benefits—and it's really quite an insult to any one with the kind of experience asked for, someone who is likely to have invested considerable sums in their education, equipment and software to have gained that experience. Checking out Cardinal Communications' Web site revealed that it's a Web-site agency that

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Bitching At Dog Bites

OK, OK, I KNOW THESE ARE THE TIMES OF the nanosecond attention span, but Gulch Gossip still hopes that those who are brave enough to entrust their words to the printed page remember what they've written from one week to the next. The ***SF Weekly's* Dog Bites** column has been doing sterling, and generally most enjoyable-to-read, work grinding up reputations in the Multimedia Gulch rumor mill with an almost ceaseless torrent of words about the shenanigans at ***Wired*, CNET**, and... are there any other players in the local new media scene? I forget, my attention wandered.

In fact, Dog Bites has done such a fine job that it's possible that Gulch Gossip will no longer see fit to continue its long running Semi-Obligatory *Wired* item of near-monthly occurrence. (But don't count on it, **Louis**!)

However, Gulch Gossip was disturbed by Dog Bites misrepresenting its own reporting record while simultaneously attempting to take a piece out of another gossip columnist, **Chris Nolan** of the *San Jose Mercury News*. It seems that Ms. Nolan, commenting on the ever-so-desirable and trendy T-shirts with the word "**Fired**" in the *Wired* logo style, attributed the creation of said items of clothing to "the folks at CNET." Terrier-like, Dog Bites pounced, declaring, "Actually, as reported here last week, the infamous Fired shirts are being produced by the significant other of a current *Wired* employee." Sad to report, but nowhere in the relevant issue did Dog Bites report such a thing, having contented itself merely with the words, "the mass layoffs at Wired Ventures... represented an entrepreneurial opportunity for at least one person."

One also wonders why Dog Bites would refer to *Wired's* "secret investor" and suggest that it is **Condé Nast**, when it has been widely known for years that Condé Nast is an investor in *Wired*. Perhaps Condé put in some extra dough but it's hardly a "secret investor."

On a very slightly related note: What gossip columnist turned up for the traditional pizza-eating portion of a friend's moving day, ate the pizza, but did none of the heavy lifting? Hint, the initials are CN but, in this case, these letters do not stand for either CNET or Condé Nast.

GULCH GOSSIP

"Waiter!..." continued from previous page

specializes in large hotel-chain sites with an emphasis on the "meetings" industry. One wonders if Cardinal hopes to introduce the wage scale for waiters and other hotel workers into the new media business—but at least waiters get tips!

Upon some prodding by another journalist, **Laurel Wellman** of the ***SF Weekly***, and one outraged contractor who now prefers anonymity, Cardinal's representative, **Ezra Ekman**, first denied the words posted and then repeatedly ate their meaning so that the position became no longer on a contractor basis and now only required grade-school experience or could perhaps be filled by "an 18-year-old with no previous job experience, but [who] has built a Web site for his high school, maybe a couple of friends, whatever, that's fine." Whatever! That's nice—but I'm left puzzled about how all the originally posted words of experience required and terms offered became so dramatically and conveniently diminished upon inquiry. Is the new-media job market really in such poor shape that Cardinal Communications expected to be able to fill that position with such meager compensation?

To read more about the state of employment in the ever-so-groovy, local new-media business, take a look at **Silja Talvi**'s piece on temp work and digital sweatshops to be found on the *SF Weekly*'s Web site at *http://www.sfweekly.com/extra/temps1-1.html* . I'm briefly quoted about one of my experiences, one that I couldn't write about in this column, but it's worth reading for more than that.

Beyond questionable terms of employment and the quality of some of the job postings for new-media types (how about a French maid/stripper? Or a house cleaner?), the second area to consider is this whole community-building issue. I've previously written that any mention of community in the digital media business immediately causes me to check my wallet to see what large corporation is after my credit cards. Thankfully, Craig's List does not raise quite that level of concern, but I'm still suspicious of the effects that a cut-price operation like Craig's List might have on other forms of community, and even businesses that attempt to do a little more than the bare minimum.

I particularly wonder about how Craig's List might affect **Media Alliance**, a long-time resource for media workers in the Bay Area. With the current worship of the free market, stock options, and the attitude every dog can only be for itself, I know that something like Media Alliance that attempts to unify workers together in some way is not very trendy. Yet, as some of the offered pay scales show, exploitation is something that's still alive and well—and general downward pressure on pay scales is something that should concern every worker who is not fully vested and securely employed with a booming company. Besides general issues of class solidarity, Media Alliance provides resources and classes for professional development that Craig's List so far does not.

These are the sort of things that seem to me to be integral to any authentic sense of community, while Craig's List offers more the sort of community that you might find on the local laundromat bulletin board. Of course, you're entitled to any sense of community that suits you, but I feel that it would be a negative thing if Craig's List were to ultimately draw support away from Media Alliance.

I bring this up because it was so clear to me that the Cardinal Communications posting was so questionable that it should have spurred some sort of action on the site beyond its mere listing. Yet when it was suggested that perhaps something be put up that outlined the issues of contracting versus salaried work and pointing to resources that would help neophytes understand what's involved in contracting, the response was lukewarm, acknowledging some "really good points" but claiming "a lot of ramifications" and excusing further action by being "really swamped" and without "the time to figure all this out."

Hey, it's a Web site—you just stick another button on the page that takes you to Resources or What You Should Know or some such category—Craig's List is not so tightly designed that this would ruin its look-and-feel. Professional agencies such as **Writers Inc.** figured out how to provide this kind of service long ago, as reported in this column in *MicroTimes* #171. It's not rocket science, but it's a basic principle in any sort of new media that comes within a mile of community building. You give some information to your audience that's useful beyond the immediate task at hand; you provide added benefits to them that help them understand what you're all about.

Unfortunately, in this case, Craig's List seemed to be all about stroking the advertiser of the open position, keeping things calm in the office, and letting the unwary learn the hard way. Not my idea of real community building, which I remind you is spelled "community building" not "commercially zoned."

Perhaps by the time you read this, Craig's List will have evolved into a more fully featured community-oriented site. It's possible; **Craig Newmark** is a very nice guy in person, hardly the type to grind the workers under his heel and certainly not to blame for the boom-and-bust conditions endemic to the San Francisco new-media scene. I'm sure he didn't write that glowing mainstream publicity about himself, and if all he wants to do is to provide job and event listings he's succeeding quite well. However, there's more than meets the eye to community building and there's more that Craig's List needs to do to be able to justifiably claim to be tackling that task.

"Waiter! Some more soup, please."

Today's Special

AS WE SET OUR EDITORIAL TABLE, THE FOLlowing addition to the menu (otherwise known as email) came in from Craig and his associates. It explains some of the confusion; I'll even admit that perhaps I jumped the gun with the feedback that the writers request at the end of the letter.

"I started craigs-list around three years ago. What started out as a hobby is about to become a non-profit.

"For some time I've wanted craigs-list to have more to it. This past summer **Nancy Melone** started to help me figure out just how that might happen. I had a couple of money offers for my list, which didn't feel right. But she suggested a non-profit which seemed a more-effective means to keep this community going and allow the list to grow. By summer's end **Weezy Muth, Christina Murphy**, Nancy Melone and I were working on starting a non-profit: the list foundation.

"I honestly feel that the list can do more as a non-profit. I'm working with good people, and you've seen first hand what they can do—our first block party, which Weezy and Christina put together.

"It's critical to Nancy, Christina, Weezy and me that we retain the personal spirit of the list and focus on *you*. The four of us will also be involved with jobs programs to help people who could use a break.

"We've committed to personally ensuring that the list keeps its community and down-to-earth spirit... and we need your feedback to keep us pretty well grounded."

Ah, well, I apologize for my early intemperate remarks, if indeed the List now provides real community services. ■

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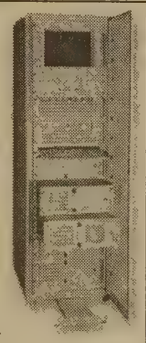

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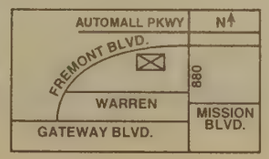

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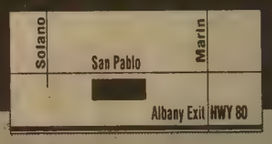

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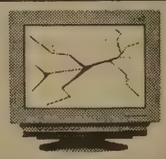

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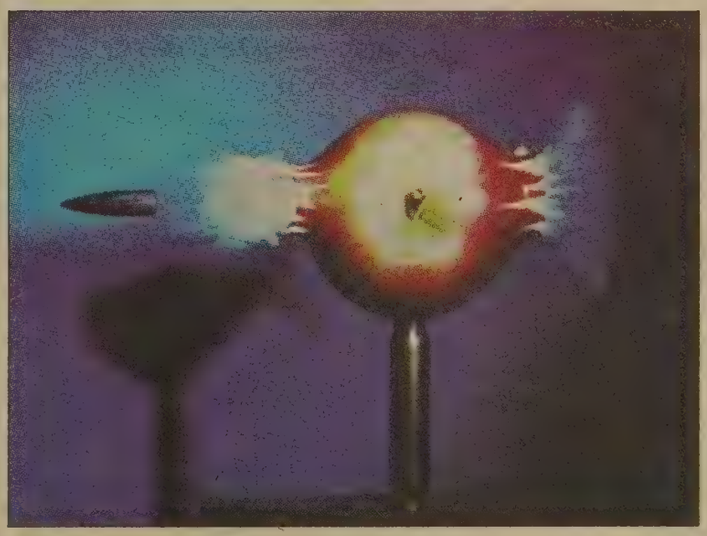
Art, Technology, And The Valley

State Of The Art

"I wish that I could somehow get every single executive in Silicon Valley to come and look at that timeline. Because I swear to God it would change the way they look at art, and it would change the way they make their technology if they realized that it's more than just speed, it's more than just bandwidth—that there are aspects of interactivity, aspects of the way we use technology that come from the human soul, that affect the way we think and the way we look at the world," exclaims Randall Packer, director of multimedia for the San Jose Museum of Art, in a moment of high-flying transportive passion.



The timeline Packer is talking about is the Interactive Timeline, also described by my fellow columnist Tony Reveaux. Produced in association with the Alternating Currents exhibition at the San Jose Museum of Art, it's designed to illustrate the connections over the past forty years between art, technology, and that peculiar combination of social and historical events and the way we live known as culture.

Without doubt, these three strands are now entwined in a tight embrace; as a technology emerges, artists rush to use it; as events occur, artists interpret their significance; as a technology reaches the market, culture responds with new styles of fashion and play; technologies are developed in response to perceived cultural needs; sometimes artists even see the future and encourage the emergence of a new technology.

Occasionally the timeline reveals some close-linked cause and effect, but the overall message is that we live in fast-moving and confused times, with multiple vectors where the three strands of art, technology, and culture tumble over each other, rolling together down the slope of history, even as they clasp each other close.

It's certainly not all direct connection. Different art, events and technologies addressing the same issues appear simultaneously, widely separated in space or milieu, apparently simply forming out of the zeitgeist of the time.

BY JONATHAN E.

ART, TECHNOLOGY, AND THE VALLEY *continued...*

And, of course, events can just happen at random, at the time seemingly without reference to anything else, although later gaining cultural significance and perhaps falling into a pattern.

That's my interpretation, anyway.

Whatever else, the fact that Reveaux and I both found our independent ways to the Alternating Currents exhibition, the Interactive Timeline, and Randall Packer at the same time should tell you something about the current state of multimedia and the significance of what's going on at the San Jose Museum of Art.

NOTHING NEW UNDER THE SUN?

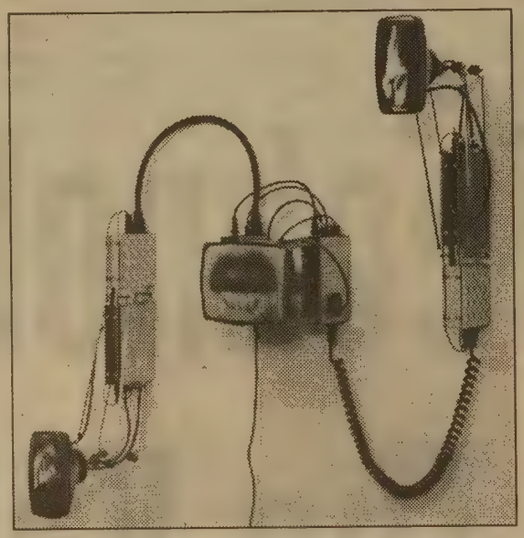
Packer's timeline covers the past forty years, a period when technology has pretty much become shorthand for "digital information and communications technology" while the word "multimedia" is often used as the catch-all term for digitally produced, manipulated and distributed media.

However, both technology and multimedia sunk roots deep into the loam of human artistic energies long before computers became commonplace. The timeline itself illustrates this, for example, with references to analog video art from the early '60s, while the Alternating Currents exhibition is almost entirely pre- and non-digital work.

In fact, a large part of its appeal is that the works are mostly so large and so fine-grained that you could not possibly experience them through the small pixelated constraints of a screen, although some pieces either are indeed screens themselves or include screens, and many use electronics of one kind or another.

The common thread is that the works are commenting on the effects of technology upon us humans and our society at a time when technology of all kinds has become increasingly intrusive into everyday life. The type of technology has also changed, from relatively simple machines designed to perform physical tasks to complex electronic systems that work more in the areas of media and communication—areas of the mind, areas where manipulation becomes not a matter of convenience but a matter of concern.

I remember that the first computer art I ever saw was at the Cybernetic Serendipity exhibition, held at the Institute of Contemporary Arts in London in 1968. At the time, it didn't mean much to me. Ignorant and unformed as I was, the art appeared to be little more than various wiggly and straight lines making some interesting, but



hardly earth-shattering, shapes, all in black and white. It was as simple and ultimately unimpressive as most digital multimedia still was in the early '90s when compared to highly developed forms such as films, video, books, or music.

However, a more attuned observer, Stewart Brand, writing in *The Last Whole Catalog* in 1969, observed, "It must have been an Event. [Actually, I did get that much even back then!] Certainly it is the best collection of computer art yet, the only one not dismissible as engineers kidding themselves. There's been talk for years (e. g. *The New Landscape*, 1956) of how art and science are gonna come together, and indeed communications have improved. But there was no direct avenue, no real mutual domain. Not until computers got common enough for funky hands to lay hold of them to do tricks for funky heads. That's happening now."

In a more prophetic vein, Brand concluded, "Ahead, deep space."

However, art and technology have danced their dance for far longer than that. A good art history book will have an index with perhaps ten or more entries for technology and art along, of course, with timelines of various artistic styles and their periods of preeminence. In a sense, artists have always used technology—and, in a way, art is a technology and always has been, right from its early days in the cave.

Beyond that, of course, art has frequently both portrayed what was going on in the culture of the times and commented on aspects of that culture. Over approximately the past five centuries, since Gutenberg, technological change has been a gradually increasing factor in social and economic conditions, while the two centuries since the Industrial Revolution have seen that influence accelerate wildly. Artists have responded in many ways to technology's effects—from revulsion at the loss of natural beauty and the social changes wrought by the economic power of new technologies, to swooning rapturous lust for the shiny new machine age with its promise to sweep away all the lingering remnants of our toiling sweaty past.

Packer wisely has not attempted to bite off the whole of this history with his timeline. Instead, he declares his aim was "to try to explain to the public where this multimedia phenomenon comes from. It didn't come out of thin air and it didn't come out of the industry, that's for sure.

"A lot of people associate multimedia with computers and even more specifically with CD-ROMs. . . . I've been very interested in the roots of interdisciplinary art, electronic art, interactive art, all of which constitutes a form that's been evolving much longer than this industry has even existed."

In fact, Packer believes that Wagner was among the first successful multimedia artists, claiming, "Wagner changed the world because he understood presentation. He built an opera house where it was all about presentation. He hid the orchestra in the pit. He turned the lights down. He built the acoustics so you were enveloped in sound. It's about presentation." Partially explaining the confused state of contemporary computer-based multimedia, he adds, "The computer industry doesn't understand presentation."

Packer expands his point by insisting, "There's a lot to look at in terms of this broader view of the medium. It gets you thinking about what the real fundamental issues are aesthetically in terms of a multimedia art form. It's not just clicking on buttons, it's not even a clicking thing, it doesn't need to be a click thing. For me, even more important than the interactivity is the notion of the integration of different media—which gets overlooked quite often in multimedia."

I ask him for a definition of multimedia and he barely hesitates, "I have my stock definition that I give in classes. How I define multimedia is as essentially a multisensory experience, a multisensory experience that may or may not actually have an interactive component to it. But essentially a multisensory experience in which multiple artistic media are woven together into a single unified expression. It's important that there's a certain symbiosis in the integration of these sensory stimuli or sensory media, that they form one complete expression."

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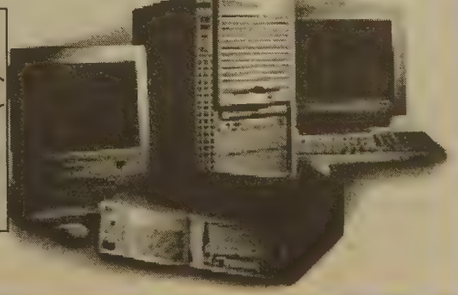

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ART, TECHNOLOGY, AND THE VALLEY *continued...*

Being an intellectual and aesthetic athlete, Packer finds this a little too easy and pat to leave alone. He relates a tale of a classroom discussion of whether film is multimedia when a student, denying the multimedia qualities of film, simply declared that multimedia is "one more medium than we're used to."

Packer didn't buy that definition, explaining, "We're so used to film being a synthesis of sound and image that we don't even think of them as being separate media. They're just like one medium fused together. Whereas if you add film and some other element to it, then it feels like multimedia because it's then one more medium than we're used to. I would say that it is multimedia. I look at multimedia from the broadest possible perspective.

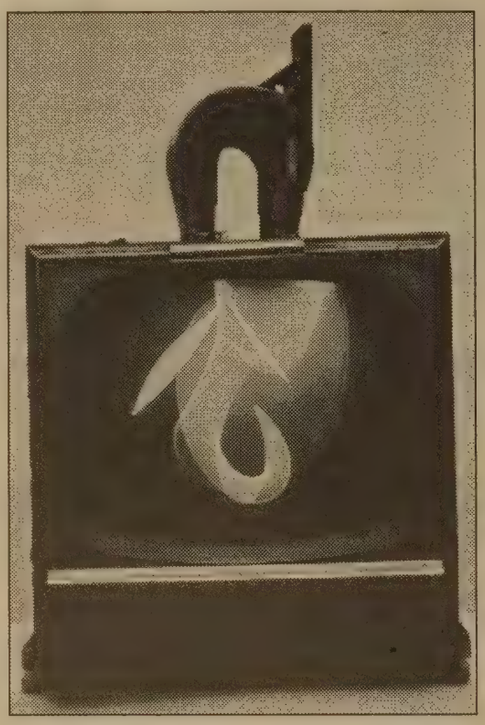
"But I think that the one thing that's really unique to multimedia as we know it today is the interactivity. That tends to get overemphasized because people don't look enough at the importance of language and the way the media are integrated together; that often gets overlooked. But what's truly unique and different about the medium is the kind of interactivity—because I would say that even movies are interactive. I actually look at movies as being interactive—theater more so, theater is very interactive. But there's a kind of interactivity that's truly unique to this medium—the ability to actually affect, not just the quality of what you're seeing, but the ordering of it, the way it plays out sequentially. You can't do that in a movie, you can't do that in a live performance."

TRIUMPH OF THE ARTISTS IN PHILISTINE VALLEY

When it comes to what he's trying to achieve as director of multimedia at the Museum, Packer is characteristically enthused about the possibilities.

"The first thing is that it needs to be clear to Silicon Valley why we're doing this. Why is it so important for a museum to be high tech? Obviously, because it's almost like the Web was created for museums. It's an ideal medium for museums because not only can you document art; you can use online space as a gallery, and you can create new art for that medium."

He goes on to explain how museums all over the world are embracing the Web by digitizing their collections and putting the resulting databases up on the Web for study. One key advantage of this is that art that is now hidden away in the vaults (the majority of most museums' col-



lections) is available for viewing in some form, even though it is admittedly not quite the same visceral experience as seeing the works up close without technological mediation.

Moving on to what this means for the high-tech industry and society at large, Packer continues, "One of the things I've been trying to explain about this, and this is important to the industry, is that here in this country there is a definite lack of cultural resources. There's a lack of appreciation of culture. Schools can't afford to teach art. People are interested in science and technology but arts are really always put in the back seat in our educational system.

"So this is an incredible opportunity to provide an educational resource that's unheard of. It means that kids in schools, kids in libraries, people of all ages, can study art on the Web, can have access to these vast archives of America's and the world's art. What a great contribution that is to making people a little bit more aware and more educated about our culture. It's a tremendous thing.

"I'm saying to people in industry and those companies that are being asked to support the museum, 'You are developing this technology, and the power of that technology is the power of access. Why not bring that access to institutions like museums so that it really plays an important role in how people are educated in this country about culture, which is of the utmost importance?' Companies in Silicon Valley that support museums can really affect our country in a dramatic way, affect our children, affect our knowledge of culture dramatically. I think it's almost a no-brainer in terms of the effectiveness of supporting institutions that are set up to educate society about culture and about all intellectual content."

I point out that there are some interesting ironies in seeking this kind of support from corporations busy changing the working landscape so fast with their products that one might reasonably ask who needs to know about anything old such as Renaissance painting, film of the '30s, or any other cultural artifacts from any time prior to the '70s, from corporations that by and large hate to pay taxes in a state where the electorate long ago decided to gut the educational system.

We're living in a time when school libraries struggle to survive and to provide basic information about biological functions, let alone espouse any sense of cultural literacy; we're living in a time when a few right-wing politicians have essentially killed what cultural programs there were in order to shove their bigotry down all our throats. We're living in a society where the populace has not only allowed these things to happen but often supports these retrogressive policies, albeit from positions of self-induced ignorance or conceptual coercion and distortion by the media. Silicon Valley's general tendencies are towards libertarian and free market attitudes that, although some effort is made to obscure the fact, are actually closely allied with the forces that have brought us to this sorry state of affairs.

Ever the optimist and the diplomat, Packer only allows, "It's ironic that the industry is creating the technology that is so powerfully enabling and at the same time the institutions that are responsible for distributing the content can barely survive. So if we can just put the two together I think we can work with each other. Museums educate, Silicon Valley companies make the technology that's now bringing this whole new level of access. If we work together we can each do what it is that we do in our role and change, absolutely change, the quality of education in this country."

Besides providing opportunities for education about the art of the past, Packer intends for the Multimedia Center to provide online space for new contemporary—specifically online and electronic—art produced in association with technology companies. "I've always dreamed of commissioning major artists together with labs on their campus facilities," he explains. "A Robert Rauschenberg or a Jenny Holzer could

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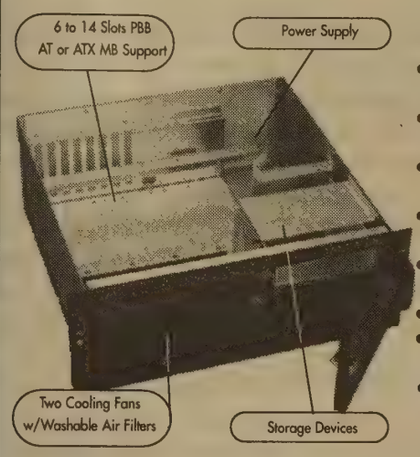

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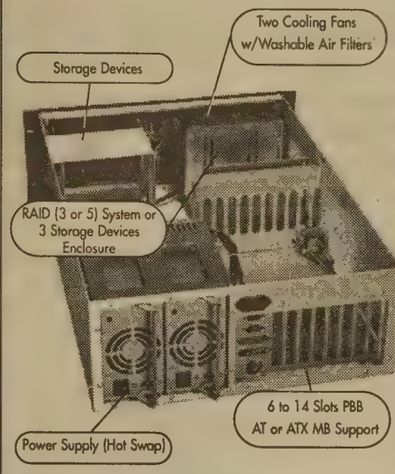

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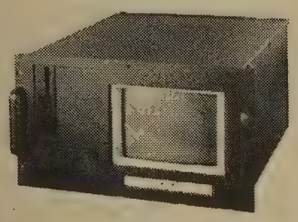

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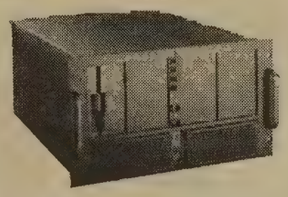

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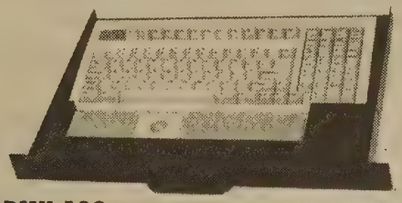

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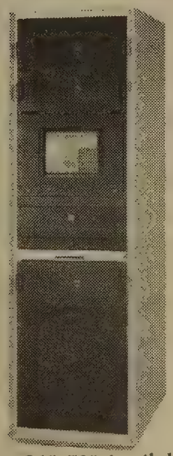

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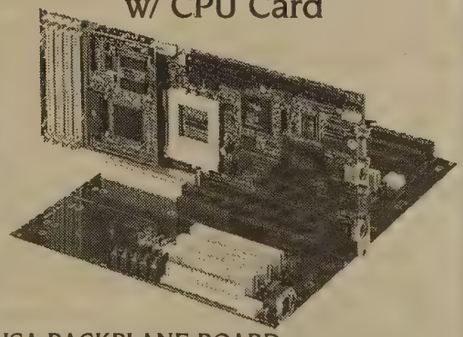

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ART, TECHNOLOGY, AND THE VALLEY *continued...*

collaborate with engineers in creating new art that is then exhibited in museums.

"This is a fantasy of mine. I don't know why it has to be a fantasy. In Japan they're doing that. NTT, the phone company in Japan, has set up a laboratory, ICC, where they're inviting artists to come and create experimental, avant garde new art, interactive art that's not necessarily trying to be accessible or easy. Some of it is very challenging, some of it's very difficult, some of it's weak, some of it's strong. They're suppporting it because it's an emerging medium; it's the future."

THE BOTTOM LINE

Not being an optimist or a diplomat, I argue that this is a difference of cultural attitude between Japan and the United States—that art is not considered useful by people who are in the business of selling things and that selling things is what this country has disproportionately become about.

Art, on the other hand, is about immaterial concepts, and often is only one piece; it's not mass-manufactured. In this high-tech industry in particular, there is a great emphasis on maximizing short-term profit whatever the long-term or side effects—what economists call "externalities."

I remind Packer that Scott Fisher, in his lecture on virtual reality at the Museum, had pointed out that in Europe questions about the effects of his work are frequently asked, while in the Valley they don't get asked at all. Artists tend to make people think and ask questions, particularly if the populace is trained to appreciate art on that level. I claim that all these things are very contrary to the interests that Silicon Valley holds at heart. I suggest to Packer, "In a sense you're trying to be an irritant to the industry, in the sense of getting their attention and asking them..."

For obvious reasons, I don't get to finish my sentence.

"I don't know if I would say irritant," Packer says, "but I would say that I'm trying for the Museum to be to some degree a mirror, not even a mirror..."

"A stimulant?" I try again.

"No."

"You're trying to distract them from their sole purpose of making money into thinking about what they're doing."

Packer is now uneasy. "Yeah," he hesitates, "because they have to."

"They have to?" I ask. "Under the current economic system why do they have to? They're just trying to make the next quarter's earnings."

"Because ultimately we all have to care about what we do and how it affects the rest of the world and the planet and the human condition. If we don't care about those things then the world will just go to pieces," Packer waxes philosophic.

I simply can't resist, "There are plenty of people who think the world is going to pieces precisely because of this technology!"

"Well, maybe then I'm trying to save the world—don't put that in there."

Sorry, Randall, it's too late to stop now. However, I charitably point out to him, "You're not defending the industry—that's not your job."

"I feel like my job is fundamentally to be an evangelist for technology as a tool and as a medium for art making," Packer sighs with relief. "As an artist myself, I feel like I make my own contribution to this body of work as it were, but I've always been interested in education. The museum is a place where education and the arts come together. I feel like what I can do is my small part in making sure that someone is addressing these issues within the context of the museum where it needs to be addressed."

Randall Packer: "There's a kind of interactivity that's truly unique to this medium—the ability to actually affect, not just the quality of what you're seeing, but the ordering of it, the way it plays out sequentially. You can't do that in a movie; you can't do that in a live performance."

When it comes to the bottom-line issues of the value of art to the industry, Packer regains his composure and expounds once more in his vigorous way, "They just have to use a little bit more of their imagination because I personally believe that if you look at things from a very bottom-line perspective, it's very difficult to see the value of experimental media art. If you're a little bit more visionary in your thinking and you're looking further down the road, you can see the connection between ideas that artists are dealing with in their work and the technologies that you're creating that are revolutionary in and of themselves.

"If you're forward-thinking enough to see the connection between artistic invention and scientific invention, then supporting that art has tremendous value. I just don't think that industry in this country is forward-thinking enough to make that connection. Whereas in Europe and in Asia they do see the connection; they do see the value in supporting new art and experimental art for that matter. But it's all a matter of education, and the reason why this situation exists is because we have lousy arts education in this country. Most people who work in Silicon Valley have not been properly educated in the arts, so how can people in Silicon Valley make the connection between artistic invention and scientific invention? That's where the Museum again comes into play."

Finding the grist of his argument again, Packer returns to discussing the Alternating Currents exhibition and the Interactive Timeline, "What are the themes that have been critical to artists who have been working with technology over the past 40 years—before computers were being used for art making? I think the most important thing about that exhibition is that in bringing out those themes—message and narrative, the perceptual relationship that we have with technology, how it alters our perception of the world—better equips us for experiencing computer art and more contemporary use of technology.

"Fundamentally, it brings to the surface what the really key issues are in experiencing any kind of art, or art and technology in this case. If the show had just dealt with computers, maybe it would have given us a look at what artists are doing today or in the past several decades with computers, but it may not have explored as well some of the fundamental experiences that need to addressed in terms of our understanding of multimedia and more contemporary computer art.

"I think that the exhibition does a tremendous job of preparing us for better understanding of what's going on in the world around us right now. What's in the Museum is the perfect way of providing the foundation for our audience on how to understand the art of the 21st century." ■

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RESOURCES:

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URL: *http://www.sjmusart.org*

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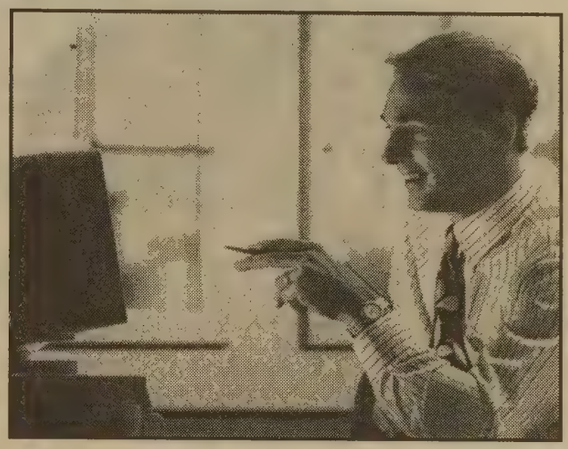

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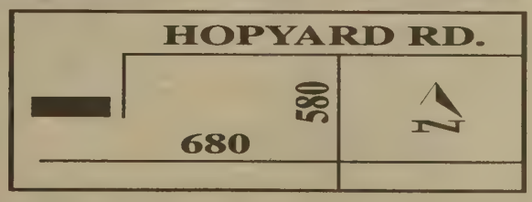

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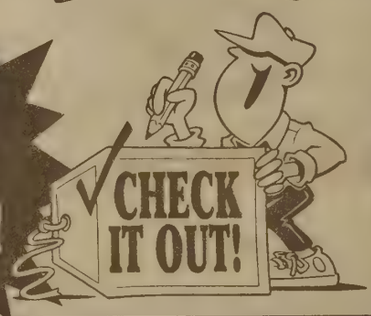

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Technology, Culture, And Art

The San Jose Museum Of Art Meets The Art Of Multimedia

Once the Gotham City of agrarian Northern California, the city of San Jose, phoenix-like, has captured national attention for the renewed vigor of its civic planning and its robust growth. Today its crops are chips and bits as it confidently shoulders the leadership of being Silicon Valley's regional capitol.

Appropriately enough, the San Jose Museum of Art has emerged as a shining avatar of how art and technology can conjoin into a higher synthesis.

ALTERNATING CURRENTS: AMERICAN ART IN THE AGE OF TECHNOLOGY

The City and the Museum made a substantial commitment to provide great art in a museum that historically never had much of a permanent collection. More than $4 million has been invested in a collaboration with New York's Whitney Museum for four exhibitions, over eight years, of great contemporary American art from 1900 to the 1990s. The result has been nothing less than world-class art right here in San Jose.

The fourth and final installment, "Alternating Currents: American Art In The Age of Technology," and its collateral elements, the "Multimedia Timeline and the Online Tour," will be up until October 1998. With restoration of the Historic Wing complete, yielding a well-designed cafe and gift shop/bookstore, this marks an exemplary commitment to multimedia and digital art.

Born in San Jose, Randall Packer was director of the Multimedia Studies Program at San

BY TONY REVEAUX

SAN JOSE MUSEUM OF ART *continued...*

Francisco State University in 1995 and 1996. While there he authored one of the courses (as did I) for the MSP's short-lived Online Curriculum. He currently serves on the faculty of the Department of Art Practice at UC Berkeley, alternating between teaching courses in The History of Multimedia and Interdisciplinary Digital Production.

Packer was invited to participate as a consultant on a committee that was advising the museum on the Alternating Currents exhibition's collateral activities. As the Museum's first director of multimedia, he was hired to create a new Multimedia Department which would oversee the development of the Multimedia Center, the installation of the network, and to build a state-of-the-art infrastructure that would support all of the Museum's multimedia activities.

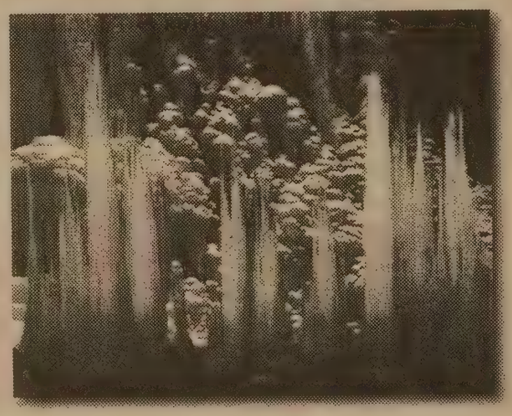
INTERACTIVE TIMELINE

Packer oversaw and directed the design and production of the Multimedia Timeline and the Online Tour of Alternating Currents. "A lot of this grew out of the work I have done in research and teaching the courses on the History of Multimedia," he says.

For planning the Multimedia Timeline, three curators took charge of three parallel paths. The curator from the Whitney, Beth Venn, took the art; the curator from San Jose, Cathy Kimball, took the culture; and Packer took the technology paths for the four decades—the 1960s, 1970s, 1980s and 1990s.

After collaborating and compiling the choices, they confirmed 120 events that are arrayed across the Multimedia Timeline wall, with sixty of them displayed on the four computer monitors inset in the wall, each monitor supporting one decade. Packer says, "The central theme is the development of the personal computer in Silicon Valley, especially in the post-Macintosh era where artists and engineers have really intersected in making possible and supporting the use of the personal computer."

He oversaw the production team with designers Jan Ekenberg and Jaime Garcia-Alvarado. They digitized all the imagery and used a Radius card with Adobe Premiere to capture all the video clips, SoundEdit 16, Macromedia Director for authoring, Photoshop and some Illustrator for all the graphic production. The wall text and the multimedia elements are integrated to provide a continuity for the sweeping changes that have raced through these forty years.



The San Jose Museum of Art's Web site points to the future of art exhibition online.

In front of each screen is a podium with a mouse and a set of headphones. In this interactive exhibit, each screen has a mosaic of fifteen images of the key artistic, cultural and technology milestones of that decade. Select any image and it enlarges to a new full-screen graphic with explanatory text and with a smaller screen that is a video clip that you can play by clicking on it.

In this unique interactive context it is not just déja vu to see M.L. King, JFK, Woodstock and disco. Most of the video clips are excerpts from documentaries and TV news, and many are riveting. Burning Man fans will feel a warm glow to see the predecessors of that artistic tradition in Jean Tinguely's self-destructing machine, Ant Farm's kamikaze Cadillac smashing through the wall of burning TVs, and Survival Research's robotic Armageddon. The ability to see a performance by Laurie Anderson in one decade, and then her Puppet Motel CD-ROM in another, provides one of those enwired links that this exhibit does so well.

ALL HANDS ON TECH

You can walk right into the Kids Interactive Lab, located in the Historic Wing, whether you are a kid or not. Or, for a little while, you can become a kid again, and a very "hands on" one at that.

Designed to complement and facilitate awareness of all the science-fair wonder of the Alternating Currents exhibition, it is a cheery industrial-strength workshop that encourages access, understanding and exploration. There are Macs and PCs and a fixed digital camera that makes it easy to get a mug shot that can be digitally diddled on the computer. You can walk through the Web and go on to try out several pre-loaded creative applications. A big work table holds a full array of analog tools like paper, crayons and scissors.

They have just opened the Multimedia Lab, an in-house production space, that will be used for the creation of future media projects. Now it is being used for the development and maintenance of the Museum's Web site. So far there is one Macintosh 8600, a scanner with slide adapter, a color printer and a Sony digital camera. In the months to come, this space will grow and diversify to provide a broadening range of media support needs.

The Multimedia Center is scheduled to open in spring of 1999 and will provide all kinds of programs and resources—events, presentations, workshops, videoconferencing and guest artists. This facility will have a heavy networking component, with several servers all running off of the high-speed local area network, probably T1 or better with 100-megabit bandwidth, supporting CD-quality audio, video and VR.

Computers will provide visitors with access to exhibitions and catalogs of digitized art work as well as Web site-specific art work. Some portions of those resources will be accessible from the Museum's Web site. At the moment the program is being hosted by San Jose-based AboveNet, who has donated bandwidth to the Museum. Packer explains, "We have developed a partnership with AboveNet so that as the museum's information needs grow they will be

continued on page 206

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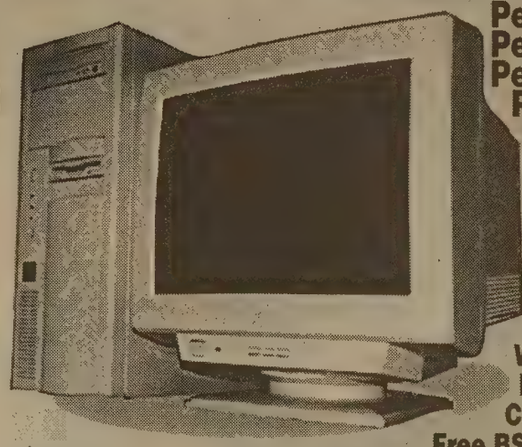

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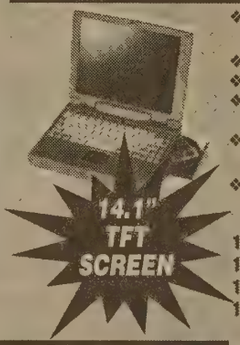

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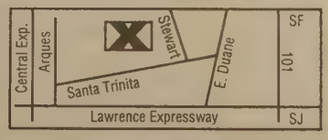

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Resources

Calendar Of Events

Conferences, Shows, Special Events

February

February 1 Livermore Amateur Radio Klub (LARK) Swap Meet. Las Positas College, Livermore. LARK. Contact: (510)783-2803, or (510)447-3857 (eves.).

February 1 MarketPro Computer Shows & Sales. Sonoma County Fairgrounds, Santa Rosa. MarketPro. Contact: 1-800-708-7555, or URL: *http://marketpro.com* .

February 3 Free Seminar: CNE/MCSE Certification–Networking For Your Future. San Jose. LANOP. Contact: (408)441-9902.

February 7 MarketPro Computer Shows & Sales. Memorial Auditorium, Richmond. MarketPro. Contact: 1-800-708-7555, or URL: *http://marketpro.com* .

February 7 Robert Austin Computer Show. Oakland. Robert Austin Corp. Contact: 1-800-243-7041 or URL: *http://www.robertaustin.com* .

February 8 MarketPro Computer Shows & Sales. Civic Auditorium, Stockton. MarketPro. Contact: 1-800-708-7555, or URL: *http://marketpro.com* .

February 9–13 Software Development '98 Conference (SD '98). San Francisco. Miller Freeman, Inc. Contact: (408)439-5570, or URL: *http://www.sd98.com* .

February 10–12 Internet Expo: Business-to-Business Enterprise Solutions. San Francisco. DCI. Contact: (978)470-3880, *confreg@dci.com* , or URL: *http://www.dci.com/internet* .

February 14 Robert Austin Computer Show. San Francisco. Robert Austin Corp. Contact: 1-800-243-7041 or URL: *http://www.robertaustin.com* .

February 14–15 MarketPro Computer Shows & Sales. Cal Expo, Sacramento. MarketPro. Contact: 1-800-708-7555, or URL: *http://marketpro.com* .

February 18–20 Mobile & PDA Expo. San Francisco. PDA Inc. Contact: (415)252-8008, *info@wmsltd.com* , or URL: *http://www.pda-expo.com* .

February 19 Free Seminar: CNE/MCSE Certification–Networking For Your Future. San Jose. LANOP. Contact: (408)441-9902.

February 21 MarketPro Computer Shows & Sales. Solano County Fairgrounds, Vallejo. MarketPro. Contact: 1-800-708-7555, or URL: *http://marketpro.com* .

February 28 MarketPro Computer Shows & Sales. Sonoma County Fairgrounds, Santa Rosa. MarketPro. Contact: 1-800-708-7555, or URL: *http://marketpro.com* .

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March

March 1 Livermore Amateur Radio Klub (LARK) Swap Meet. Las Positas College, Livermore. LARK. Contact: (510)783-2803, or (510)447-3857 (eves.).

March 3–5 Computer Telephony Conference and Exposition '98. Los Angeles. Contact: (215)355-2886, or URL: *http://www.ctexpo.com* .

March 7 Robert Austin Computer Show. San Francisco. Robert Austin Corp. Contact: 1-800-243-7041 or URL: *http://www.robertaustin.com* .

March 21 Robert Austin Computer Show. Oakland. Robert Austin Corp. Contact: 1-800-243-7041 or URL: *http://www.robertaustin.com* .

March 28 Robert Austin Computer Show. San Francisco. Robert Austin Corp. Contact: 1-800-243-7041 or URL: *http://www.robertaustin.com* .

March 29–April 2 INFOCOM '98. San Francisco. Contact: (908)949-2761, *ramesh@bell-labs.com* , or URL: *http://www.comsoc.org/infocom/98* .

April

April 3–4 OPENARCH '98. San Francisco. Contact: (212)854-1747, *aurel@ctr.columbia.edu* , or URL: *http://comet.ctr.columbia.edu/openarch* .

April 21–23 DSP Spring Design Conference. Santa Clara. Miller Freeman, Inc. Contact: 1-888-239-5563, *dspworld@mfi.com* , or URL: *http://www.dspworld.com* .

April 21–23 Embedded Systems Conference. Santa Clara. Miller Freeman, Inc. Contact: 1-888-239-5563, *dspworld@mfi.com* , or URL: *http://www.dspworld.com* .

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FEBRUARY 9–13

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MARCH 16

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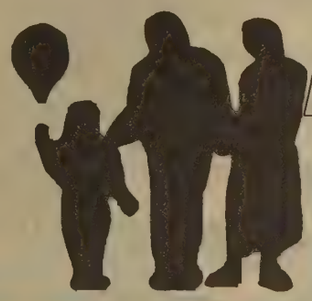

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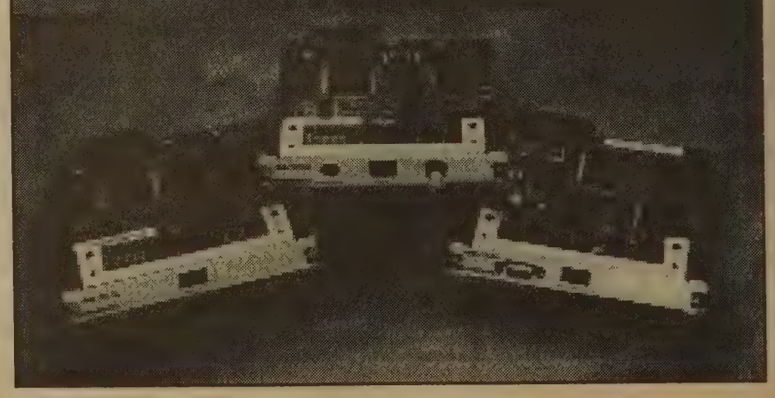

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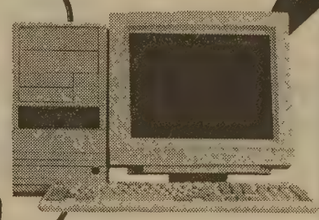

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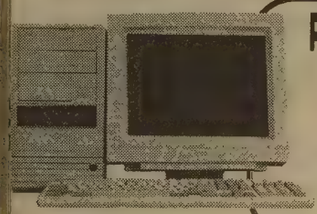

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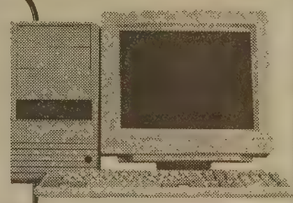

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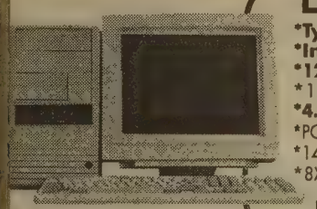

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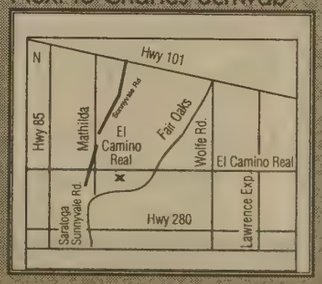

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Calendar Of Events *continued from page 182*

April 27–29 Internet & Electronic Commerce Conference and Exposition (iEC). New York, NY. Gartner Group. Contact: (203)256-4700, *iec@expocon.com*, or URL: *http://www.expocon.com*.

April 30–May 1 IEEE-USA Conference: "Engineering Careers into the 21st Century: Maximizing Individual and Organizational Growth." Phoenix, AZ. Contact: (202)785-2180.

Classes, Seminars, Workshops

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January 24 Enter The Net. San Francisco. Center for Electronic Art. Contact: (415)512-9300, *info@cea.edu*, or URL: *http://www.cea.edu/*.

January 25 Fitness For The Computer Athlete. San Francisco. Center for Electronic Art. Contact: (415)512-9300, *info@cea.edu*, or URL: *http://www.cea.edu/*.

January 26–29 AutoCAD R14 3D Workshop. Santa Clara. The Copper Connection. Contact: (408)970-9838, *TeachACAD@aol.com*, or URL: *http://www.copperconn.com*.

January 28 Kurzweil, Dragon, and IBM Speech-Recognition Free Demonstrations. San Mateo. Zephyr Training and Evaluation Co. (ZTEC). Contact: (415)655-2405, or URL: *http://members.aol.com/zephyrbus/web/*.

January 29–February 19 Visual Design 1. San Francisco. Center for Electronic Art. Contact: (415)512-9300, *info@cea.edu*, or URL: *http://www.cea.edu/*.

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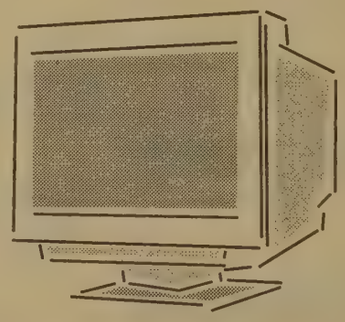

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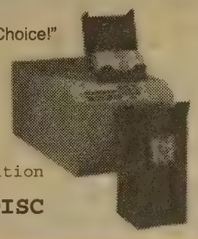

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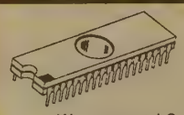

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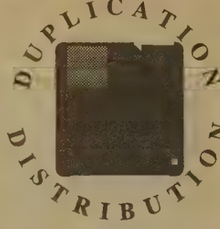

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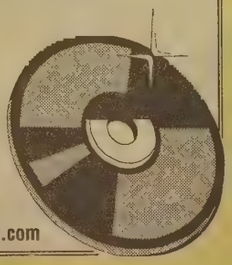

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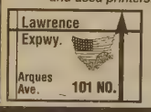

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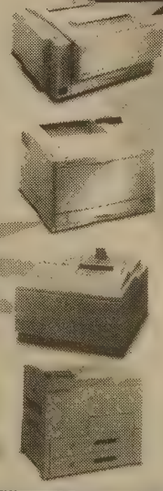

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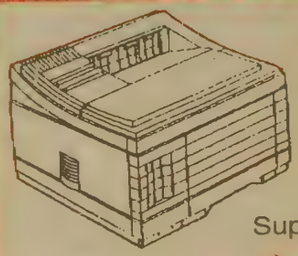

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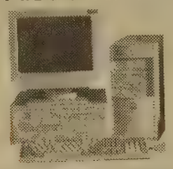

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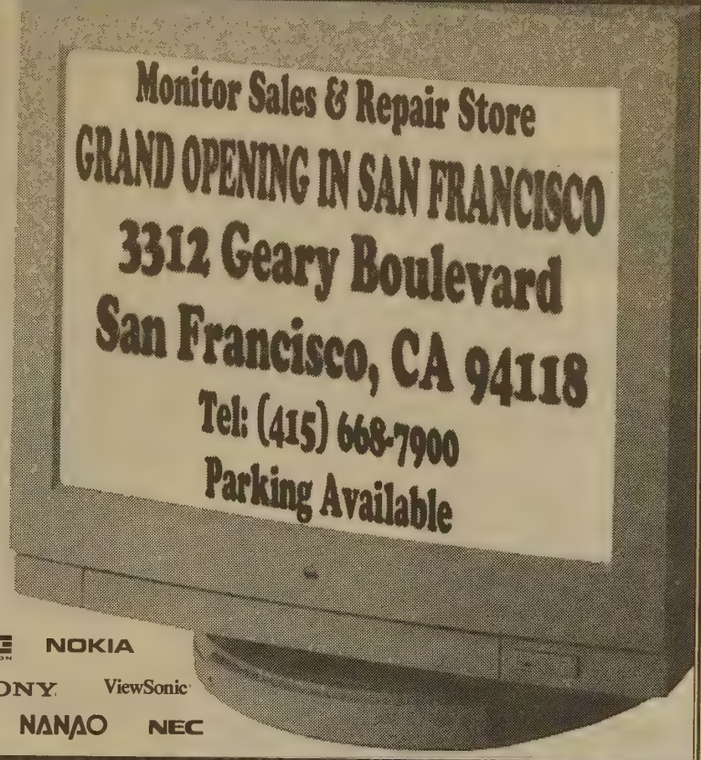

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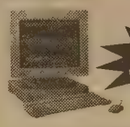

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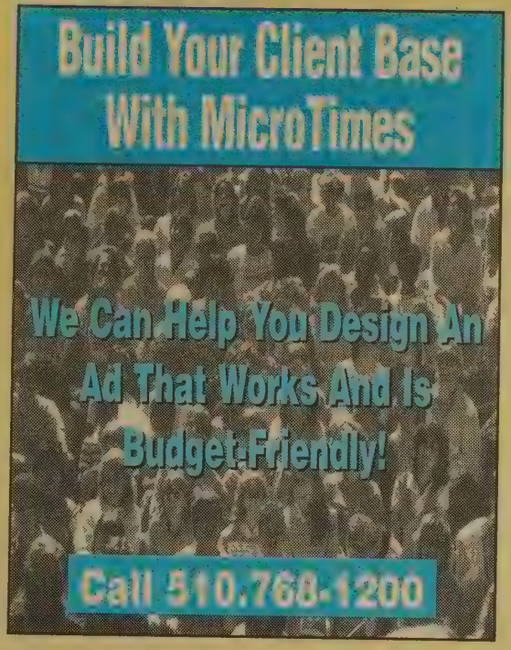

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Maverick's Quodtegitur BBS. (209)223-1590. 24 hrs., 33,600. DOOM/Wolfenstein 3-D files, 500+ flight-sim files, RIP graphics. Free. Sysop: The Maverick. [Exp. #175.]

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Star League BBS. URL: *http://www.starleague.com* . Former Bay Area BBS now based in Oregon. Visit Web site for more information. Sysop: Mark Wilson. [Exp. #178.]

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Peninsula Computer BBS. (650)571-9259. 8-N-1, 24 hrs., 2400–28,800. GT Power Network v1900; email; nearly 2,000 files: DOS, OS/2, shareware, door games for callers. Sponsored by the Peninsula Computer Club. FREE BBS. URL: *http://www.sirius.com/~jlo* . Sysop: Bob Wallace. [Exp. #176.]

The Benchmaster's BBS. (650)473-3980. 8-N-1, 24 hrs., 28,800. Files and messages for the Amiga computer only. Free. [Exp. #176.]

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707

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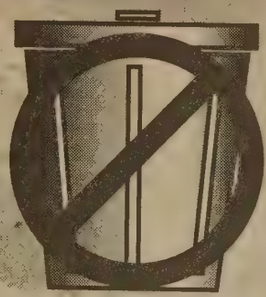

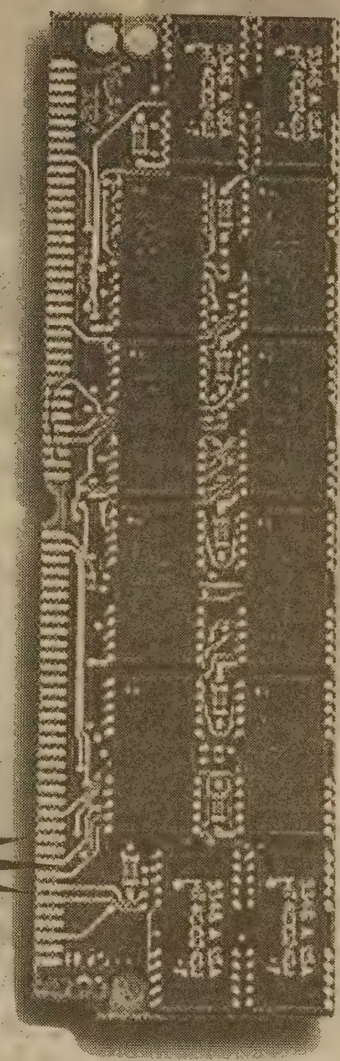

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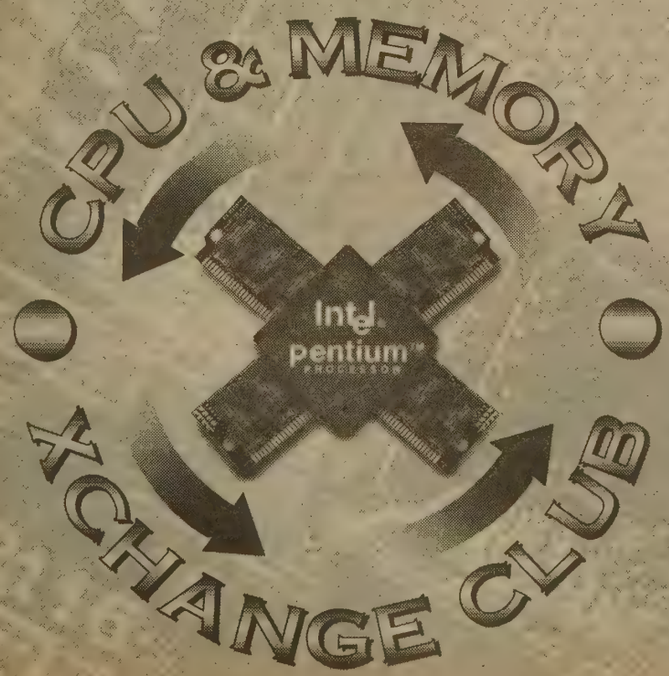

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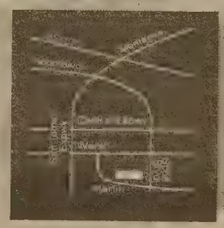

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USER GROUPS

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AWEST—Amiga Users In SF. Meetings: 2nd Wed., 6:30 pm, Excelsior Branch Public Library, 4400 Mission St. (near Ocean), San Francisco. Call: (415)474-1164; BBS (415)441-1120. [Exp.#181.]

TOGA—The Other Group Of Amigoids. Meetings: 4th Sat., 12:30 pm, Milpitas Community Library Meeting Room, 40 N. Milpitas Blvd., Milpitas. An informal group to share ideas, PD software, and information. Free. Contact: Randy Abel, (408)356-9405 or *rabel1@dsp.com* ; Warren Burnham, (408)252-3406 or *wburn46506@aol.com* ; URL: *http://www.calweb.com/~rabel1* . [Exp.#179.]

ATARI

ABACUS—Atari Bay Area Computer Users Society. Meetings: 1st Sat., 1:00 pm, Potrero Branch Public Library, 2nd floor, 1616 20th St., San Francisco. Supporting all Atari computers and video games systems. Call: Roger Sinasohn, (415)469-7924, BBS (415)564-8062. [Exp.#176.]

San Leandro Computer Club. Meetings: 1st Tues., 8:00 pm, San Leandro Main Library, Estudillo Room, 300 Estudillo Ave. Call: Robbie, (510)797-5636. [Exp.#179.]

CAD

San Francisco 3D Studio User Group. Check Web site for location, date, subject and other information. URL: *http://www.sf3dsug.com* . [Exp.#175.]

COMMODORE

CHUG (Commodore Hayward User Group). Meetings: 2nd Sat., 2:00–4:00 pm, Palma Ceia Park Clubhouse, Hayward. Commodore 64 and 128 owners are welcome to attend. Call: (510)793-7868. [Exp.#176.]

CWEST—Commodore 64/128 Users In SF. 2nd Wed., 6:30 pm, Excelsior Branch Public Library, 4400 Mission (near Ocean), San Francisco. Call: (415)474-1164; BBS (415)441-1120. [Exp.#181.]

Diablo Valley Commodore Users Group. Meetings: 3rd Thurs., 7:00 pm, Clayton Valley Presbyterian Church, 1578 Kirker Pass Rd., Clayton. Call: (510)689-3224. [Exp.#176.]

FUNHUG (Fremont, Union City, Newark, Hayward User Group). Meetings: 3rd Thurs., 7:30 pm, Newark Public Library, 6300 Civic Terrace Ave., Newark. For the Commodore 64/128 computer. Call: (510) 793-7868. [Exp.#176.]

IBM AND COMPATIBLES

AT&T Computer Users Group. Meetings: 1st Wed., 7:00 pm, 50 Fremont St., 40th Floor (near 1st and Mission), San Francisco. Demonstrations, technical support, informal discussion. Call: (415)885-6631. [Exp.#176.]

Berkeley PC Users Group—BPCUG. Meetings: 2nd, 3rd, and 4th Tues., 7:00 pm, Winner's Circle Systems, 2618 Telegraph Ave., Berkeley. Public domain library, newsletter, and separate Beginners Special Interest Group meeting. Contact: Mel Mann, (510) 526-4033 or *melmann@aol.com* . [Exp.#176.]

Business Operations SIG of the Software Forum. Meetings: 1st Thurs., 7:00 pm, Palo Alto. Free to members, $10 for non-members. Contact: Brian Tien, *brian@leansoft.com* . [Exp.#175.]

Diablo Valley User Group—DVPC. Meetings: 1st Thurs., 7:00 pm, Bank of America, Bldg. B, 2001 Clayton Rd. at Galindo, Walnut Creek. SIGs include Internet, Windows, Beginner's, Visual Basic, education/entertainment, and more. Call: Craig Peterson, (510)556-1449, *bod@dvpc.org* , or URL: *http://www.dvpc.org* . [Exp.#179.]

East Bay FOG. Meetings: 2nd Wed., 7:30 pm, Episcopal Church of St. John-in-Montclair, 1707 Gouldin Rd., Oakland. All microcomputers, MS-DOS, CP/M. Call: (510)653-2627, 8 am–10 pm. [Exp.#176.]

Golden Gate Computer Society. Meetings: 4th Mon., 7:00 pm, San Rafael Community Center, 618 B St., San Rafael. Free intro to computers class at 6:00 pm. Call: (415)454-5556, or URL: *http://www.ggcs.org* . [Exp.#179.]

Napa Valley PC Users Group. Meetings: 2nd Wed., 7:30 pm. Guests welcome. Call: Lee Schwab, (707)257-2675, *programs@nvpcug.org* , or URL: *http://nvpcug.org/* for details and location. [Exp.#176.]

PC Clubhouse. Meetings: 1st Fri., 7:30 pm, swap at 7:00 pm, Meiklejohn Hall, Room 2002 (inside 1009), CSU Hayward. Learn more about your computer. Product demos. Member help. Call: (510)538-2449, (510)276-6450, or URL: *http://www.pcc.org* . [Exp.#176.]

Peninsula Computer Club. Meetings: 2nd Thurs., 7:30 pm, 222 Laurel St., San Carlos. DOS and CP/M libraries. Call: (650)593-9981, BBS (650)571-9259, or *larryw3553@aol.com* . [Exp.#179.]

San Francisco Business Computers. Meetings: 4th Tues., 5:30 pm, 110 Pacific, Ste. 153, San Francisco. For people who use computers in their work. Visitors $10. Contact: *sfbc@juno.com* . [Exp.#178.]

San Francisco PC Users Group. Meetings: 3rd Tues., 7:30 pm, PUC Auditorium, 505 Van Ness Ave./McAllister. Presentations, Q&A sessions. Call: Jerry Stern, (415)572-1100 or 777-1332 for recorded events message. URL: *http://www.sfpcug.org/~group* . [Exp.#176.]

Stanford Palo Alto Users Group For PC (SPAUG). Meetings: final Wed., 7:30 pm, Conference Center at EPRI, 3412 Hillview, Palo Alto. All welcome. Call: Bev Altman, (415)368-9530 or 329-8252. [Exp.#176.]

INTERNATIONAL

International Software SIG Of the Software Forum. Meet-ings: 4th Mon., 7:00 pm, Palo Alto. Free to members, $10 for non-members. Contact: Charlie Pfefferkorn, *charliep@crystal-mediacom* . [Exp.#175.]

INTERNET

Internet Development SIG Of The Software Forum. Meetings: 4th Tues., 7:00 pm, San Francisco. Free to members, $10 for non-members. Contact: Scott Rozic, *scott@sfsoftware.com* . [Exp.#175.]

Internet SIG of the Association of Database Developers (A.D.D.). Meetings: 3rd Tues., 7:00 pm, CyberWorld Cafe, 526 Folsom St., San Francisco. Contact: Patrick Lynch, (510)482-5329, 482-5752 (fax), *patl@a.crl.com* , or URL: *http://www.well.com/user/add/cal.htm* . [Exp.#175.]

Internet SIG Of The Software Forum. Meetings: 2nd Wed., 7:00 pm, Palo Alto. Free to members, $10 for non-members. Contact: Dave McClure, *daveaslan@msn.com* . [Exp.#175.]

SVCS Internet SIG. Meetings: 1st Mon., 7:30 pm, Baker's Square Restaurant, 2910 El Camino Real, Santa Clara. Contact: URL: *http://www.svcs.org/sigs/inet.html* . [Exp.#176.]

LEGAL

SF Bar Assoc. WordPerfect User Group. Meetings: 3rd Wed. odd-numbered months, noon, 465 California St., 11th floor, Boardroom. Chair: Al Buchignani. Call: (415)421-5650. [Exp.#179.]

MACINTOSH

Association Of A32 Users. Meetings: 2nd Sat., 10:00 am–noon, Sunnyvale Community Center Arboretum, 550 E. Remington Ave (near the corner of El Camino and Fair Oaks). A non-profit computer users group (Mac, Newton and other GUI). Q&A session; guest speakers and vendor demonstrations; shareware, freeware, and PD software disks. Call: (408) 881-0790, BBS: (408)378-8252. [Exp.#175.]

BMUG—Berkeley Macintosh User Group. Meetings: every Thurs., 6:30 pm, 2055 Center St., Berkeley (1/2 block south of Berkeley BART at Shattuck). BMUG is the world's largest Macintosh user group. All meetings are free, membership not required. Several SIGs also meet in the main office. Call: (510)549-BMUG, or URL: *http://www.bmug.org* . [Exp.#179.]

Diablo Valley Macintosh User Group (DVMUG). Meetings: 3rd Tues., 7:00 pm, Bancroft Elementary School, 2200 Parish Dr., Walnut Creek. Call: Tom Bacon, (510)945-4548 or URL: *http://www.designlink.com/dvmug* . [Exp.#175.]

SLAEUG—San Leandro Mac User Group. Meetings: 1st Thurs., 7:30 pm, San Leandro High School, 2200 Bancroft Ave., San Leandro. Best DOM (3 disks) anywhere. Call: Stan (510)351-3973 or *skline@concentric.net* . [Exp.#179.]

The Gay Macintosh User Group (GMUG). Meetings: 4th Thurs., 7:30 pm, St. Francis Lutheran Church, 152 Church St., San Francisco. We have answers to your Mac-related questions and members can win free software. Contact: (415)552-GMUG, or URL: *http://www.gmug.org* . [Exp.#176.]

TriValley Macintosh User Group (TMUG). Meetings: 3rd Tues., 7:30 pm, Sonoma School, 543 Sonoma Ave., Livermore. Q&A, DOM, vendor presentations. Book, CD, MacAcademy training libraries. Free to public. Call: Jerry, (510)830-8838. [Exp.#176.]

MISCELLANEOUS

FileMaker Pro Database Interest Group (DIG.FM). Meetings: 3rd Thurs., 7:00 pm, Claris Corp., 5201 Patrick Henry Dr., Santa Clara. Presentations, demos, and tips by and for passionate users of FileMaker Pro for both Mac and Windows. Not affiliated with Claris. Free. Contact: *info@digfm.org* , or URL: *http://www.digfm.org* . [Exp.#176.]

Marketing SIG Of The Software Forum. Meetings: 2nd Mon., 7:00 pm, Palo Alto. Free to members, $10 for non-members. Contact: Stan Trumbull, *strum@bayarea.net* . [Exp.#175.]

MS Access Peninsula User Group. Meetings: 2nd Fri., 1:00 pm, Metro Center Building, 9th floor, Foster City. All welcome from beginners to professionals. Contact: URL: *http://www.rampage.net/accdocs/sigs/htm* . [Exp.#175.]

PACGUG—Palo Alto Computer Game User Group. Not yet decided. Now accepting members. $20/year membership fee. Contact: *kkp@accuserve.net* . [Exp.#175.]

Society for Technical Communication. Meetings: 3rd Weds., 6:00 pm, London Wine Bar, 415 Sansome St., San Francisco. For technical writers and editors. Newsletter, annual competition. Non-members, $12. Contact: (415)985-7121, URL: *http://stc.org/region8/sfc/www* . [Exp.#175.]

MULTIMEDIA

Multimedia SIG Of The Software Forum. Meetings: 4th Thurs., 7:00 pm, Cubberly Community Ctr., 4000 Middlefield Rd., Rm. H-1, Palo Alto. $10. Contact: Mike Schmit, *mschmit@compcore.com* . [Exp.#179.]

NETWORKING

EBNUG (East Bay Netware User Group). Meetings: 3rd Thurs., 6:30 pm, Bayer Auditorium, 800 Dwight Way, Berkeley. Contact: (510)705-5543; for more information contact Andy Zutler at (408)524-2600 or *AZutler@Radiolan.com* . [Exp.#175.]

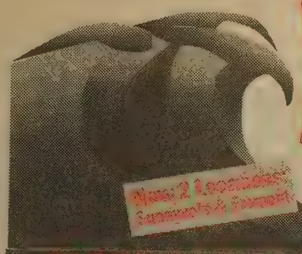
South Bay Novell User Group. Meetings: 2nd Thurs., 6:00 pm, Novell offices, 2275 Trade Zone (at Lundy, off Montague east of 101), San Jose. Buffet, vendor presentations, technical education, user forums, "Networking in Hell" stories. Contact: (650) 525-4567 or *ALLANH@SBNUG.ORG* . [Exp.#179.]

NOVELL

Novell Users Group of Monterey/Salinas/Santa Cruz. Meetings: 3rd Thurs., 6:30 pm, 40 Ragsdale Dr., (Ryan Ranch), Monterey. Membership: $25/year or $5/meeting. Contact: *jspencer@redshift.com* . [Exp.#179.]

OS/2

OS/2 Bay Area User Group. Meetings: 4th Mon., 7:00 pm, Stanford Linear Accelerator Center Auditorium, 2575 Sand Hill Rd., Menlo Park. Free to members, non-members $3. Presentations, demonstrations, technical discussions. Call: (510)945-7565 ext. 100, or URL: *http://www.davebsoft.com/os2baug* . [Exp.#175.]



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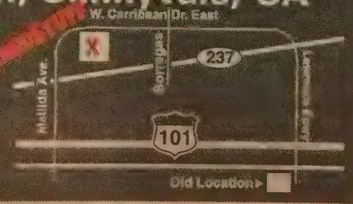

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USER GROUPS continued...

PROGRAMMING LANGUAGES

Berkeley Java Users Group. Visit bjugNET to find out why we live, breathe, and speak Java. Meetings twice a month in Berkeley. Contact: *tpc@bjug.net*. [Exp.#175.]

Delphi SIG Of The Software Forum. Meetings: 2nd Weds., 7:00 pm, North Bay. Free to members, $5 for non-members. Contact: Bjarne Winkler, *nts4618086@aol.com* . [Exp.#175.]

Fox-VFP SIG of the Association of Database Developers (A.D.D.). Meetings: 1st Thurs., 7:00 pm, 124 Beale St., mezzanine level, San Francisco. Contact: Dean Lesner, (415)788-4366, *dlesner123@aol.com* , or URL: *http://www.well.com/user/add/cal.htm*. [Exp.#175.]

Java SIG of the Association of Database Developers (A.D.D.). Meetings: 1st Wed., 7:00 pm, 124 Beale St., mezzanine level, San Francisco. Contact: Mark Carranza, *mc2@surf.com* , or URL: *http://www.well.com/user/add/cal.htm*. [Exp.#175.]

Java SIG of the Software Forum. Meetings: 1st Mon., 7:00 pm, Cubberly Community Ctr., 4000 Middlefield Rd., Rm. H-1, Palo Alto. Free to members, $10 for non-members. Contact: Tom Hill, *javasig@worldware.com* . [Exp.#175.]

Visual Basic–San Francisco SIG of the Software Forum. Meetings: 3rd Thurs., 6:30 pm, San Francisco. Free to members, $10 for non-members. Contact: Bill Storage, *storage@nerve-net.com* . [Exp.#175.]

Visual Basic–Silicon Valley SIG of the Software Forum. Meetings: 2nd Thurs., 6:00 pm, Palo Alto. Free to members, $10 for non-members. Call: Allan Colby, *acolby@guidex.com*. [Exp.#175.]

VRML SIG of the Software Forum. Meetings: 3rd Tues., 7:00 pm, Mountain View. Contact: Katherine Bretz, *kbretz@fsc.fujitsu.com* . [Exp.#175.]

TEXAS INSTRUMENTS

TI-99/4A. Meetings: 2nd Sat., Oakland. Need programs/hardware? Call: Fred, (510)530-8335. [Exp.#179.]

UNIX

City College of San Francisco Linux Users Group. Meetings: Every Thurs., 3:00 pm, CCSF Student Union, MLK Center, 50 Phelan Ave., San Francisco. Free and open to all interested in Linux and/or UNIX. Contact: (415)239-3108, or *jhauck01@ccsf.cc.ca.us*. [Exp.#179.]

WINDOWS

Windows NT Engineering Association of Silicon Valley (NTEA). Meetings: Second Tues., 6:00 pm, Santa Clara County Office of Education building, 1290 Ridder Park Dr., San Jose. Idea exchange, new technology, job opportunities. Design, set-up, and troubleshooting servers, system administration, and software development issues. No fee for first-time participants. Contact: (408) 437-8803. [Exp.#176.]

Windows SIG Of The Software Forum. Meetings: 1st Weds., 6:30 pm, Palo Alto. Free to members, $20 for non-members. Contact: Fran Finnegan, *fran@fomci.com*. [Exp.#175.]

ASSOCIATIONS

Association For Women In Computing. Meetings: 1st Wed., 6:00 pm, standing room only, Crocker Galleria, 50 Post St., San Francisco. $10 members, $15 guests. Call: (415)979-8450. [Exp.#176.]

Association of Database Developers (ADD-SF). Barbara Paltiel, (415)345-0152, *barbara@paltielinc.com* , or URL: *http://www.well.com/user/add/cal.htm*. [Exp.#176.]

ICCA Silicon Valley. Meetings: 4th Tues., 6:00 pm, Hobbee's Restaurant, 920 Town and Country Village (Steven's Creek/across from Valley Fair Mall), San Jose. Regularly scheduled dinner meetings, $25 non-members/$20 members. Contact: Paul Stith, (408)439-0870, ext 2, *info@icca-sv.org* , or URL: *http://www.icca-sv.org* . [Exp.#179.]

San Francisco Association of Internet Professionals. A membership- and chapter-driven organization with the ability to unify, support, and represent the global community of Internet professionals. See Web site for meeting times/location. Contact: Jeff Ward, (408) 899-2011, *jward@hotmail.com* , or URL: *http://www.association.org*. [Exp.#179.]

Society of Technical Communications, Silicon Valley Chapter. Meetings: 4th Tues., Objectives are to advance the arts and sciences of technical communication. Includes San Mateo, Santa Clara, and Santa Cruz counties. Contact: Gwen Johnson, (408)285-7942, or *John son_Gwen@tandem.com* . [Exp.#176.]

MultiMedia & BEYOND

SAN JOSE MUSEUM OF ART *continued from page 180*

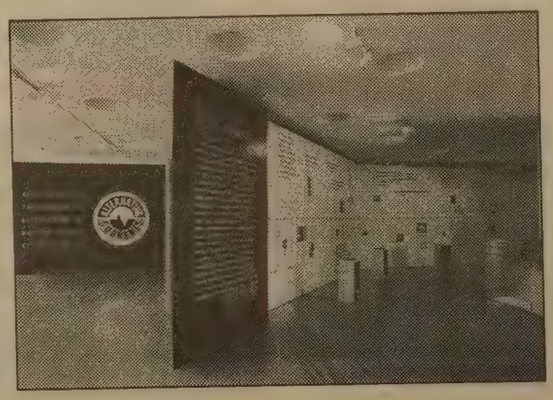
to be able to supply us with the bandwidth that we need."

ONLINE GUIDED TOUR

If you surf the museum Web sites of the world you will find a wide variety of exhibition information, ranging from simple text listings to near-virtual representations, such as can be found in the Fine Arts Museums of San Francisco's pages *(http://www.thinker. org)*. The San Jose Museum of Art's site features a guided tour of the Alternating Currents show that provides a complete map of the gallery experience. For those who cannot reach the Museum, it offers the next best thing. For those of you who are planning to visit, it gives a preview. For scholars and past visitors, here's where you can look up answers to questions and to review what you saw.

The Online Tour follows the same three themes/three rooms continuity, which is also reflected in the optional on-site audio tour of the exhibit floor for analog visitors. If you choose the Guided Tour, it will step you through the entire Web tour in the same continuity as the audio tour.

With Packer's oversight, Jaime Garcia-Alvarado produced the Online Tour using NetObjects for authoring. The RealAudio encoder was employed to convert the audio-cassette-based audio to digitized and compressed data for RealAudio streaming, so that you can listen to those comments as you step along the Web tour. All the wall text in the exhibit is posted on the pages of the Web site, along with many of the images viewable in two screen sizes. The San Jose Museum of Art's Web site points to the future direction of art exhibition online.■



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RESOURCES:

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PC World, December 1997

"Fast, good price for Pentium Pro-200MHz"
PC World, January 1997

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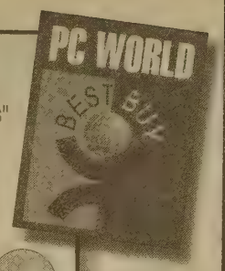
PC World, May 1996



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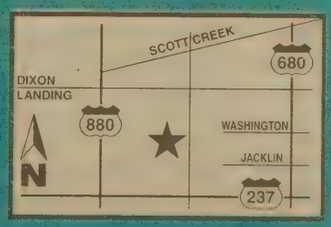

Web Page Listings *continued from page 152*

Arctic Travel *http://www.arctic-travel.com* A travel guidebook that aims to become the most comprehensive guide to the Canadian Arctic is now online. [Exp. #176.]

Astrology Now! *http://onesky.com/astrology* Find detailed information about your astrological sign, compatibility with others, and of course horoscopes! [Exp. #176.]

Black Moon *http://www.black-kat.com/blackmoon* Promotes appreciation of Japanese animation and culture by showcasing current anime, art, and related exhibitions. [Exp. #176.]

Bright Spot *http://www.getawaynow.com/bahia-luminosa* Costa Rica—Bahia Luminosa beachfront resort and hotel where our forest meets the sea. [Exp. #176.]

Capt. Ted's Whooping Crane Tours *www.sirius.com/~sarabel/Crane.html* Vacation idea for the adventurous: where to go to see the whooping crane. Includes sounds and footprints plus original art. [Exp. #176.]

Carolina Corner *http://www.carolinacorner.com* Features businesses, recreation, and tourism in ten counties of Northwestern North Carolina. [Exp. #175.]

Celebrate History! *http://www.celebratehistory.com* A new, unique event for everyone who loves history—February 13-15 1998, South San Francisco, CA. [Exp. #176.]

Cheat Sheet For Travelers *http://www.oanda.com/cgi-bin/travel* A wallet-sized currency conversion table. [Exp. #176.]

CineSecrets *http://www.CineSecrets.com* Movie inside stories.The source of unofficial *Star Wars* inside information plus the making of *Highlander, Superman, Lifeforce, Krull,* and many others. [Exp. #176.]

Comedy-O-Rama *http://www.comedyorama.com* A great site filled with original, free comedy, RealAudio, comic strips, links, and more. [Exp. #176.]

Da-Zone Download Station *http://www.da-zone.com* [Exp. #175.]

Dark Skies At PlanetENZ *http://planetenz.com/darkskies* The official Web site of the Save Dark Skies Campaign. [Exp. #175.]

David Patrick Ryan's Rivendell—The Music Of Enya *http://www.brodnet.com/users/r_david/enya01.htm* Wherever beauty is to be found in this world, one can picture it quite vividly when listening to Enya's musical pieces at Rivendell. [Exp. #176.]

Detroit's Woodward Dream Cruise Juke Box *http://www.nexusit.com/woodward/index.html* Featuring a slide show and streaming music. [Exp. #176.]

DJ14K's Tapes R Us *http://www.geocities.com/SunsetStrip/Studio/4513* Wicked selection of reggae soundsystem tapes and videos for sale/trade. Also, check the sounds, links, and the massive list! [Exp. #176.]

Dolphin Yacht Charters *http://www.dolphinchar.com* Cruise the islands in our sailboat yachts for your vacations in St. Vincent, Grenadines, Barbados, and other Caribbean Islands. [Exp. #176.]

DR's Sports *http://www.signatures.com* The best "in-person" sports and celebrity autographs on the Internet. [Exp. #176.]

DVD Source *http://www.dvd-source.com* Discounted DVD movies with an online catalog and searchable database. [Exp. #176.]

Earthquake City BBS *http://members.tripod.com/~eqcitybbs/Index.htm* Earthquake City BBS, Computers By Candlelight (radio show), Chrome Oxide music collector pages, lots of links. [Exp. #176.]

Empire Cigar Company *http://www.empirecigar.com* The finest in premium cigars and cigar-related accessories. [Exp. #176.]

Film Production Advertising Television Commercial International *http://www.dragonslayer.com.au* Virtual showcase of our spots. [Exp. #176.]

Flapper Station *http://www.sns.com/~rbotti* Take a step back in time, back to the 1920's when cars had running boards and gangsters were running gin! Links to the music, autos, silent film and radio of the Roaring '20s. [Exp. #175.]

Fort Payne Alabama City Limits *http://www.fortpayne.com* Great pics and overview of this scenic community. [Exp. #176.]

Gold Club Casino *http://www.goldclubcasino.com/* The ultimate online gambling experience. [Exp. #176.]

HOF Memorabilia *http://www.hofmemorabilia.com* Specializing in authentic autographed sports memorabilia. [Exp. #176.]

Hotels And Condos, Reservations Service For The Cayman Islands *http://www.silvanaus.com* Caribbean Dreams—destination management and reservations. [Exp. #176.]

J & S Ranch *http://jsranch.org* A premier horse boarding, training, and sales facility. [Exp. #176.]

Jason's MUME Home Page *http://home.inreach.com/droysdon/jroysdon/MUME* MUME is a live, multi-user dungeon fantasy roleplaying game based on J.R.R. Tolkien's Middle-Earth. [Exp. #177.]

KZ Mobile Entertainment Services *http://pw2.netcom.com/~lilalynn/KARAOKEZONE.html* KJ's/DJ's, vocal acts, photographer, etc.; Karaoke show listings and equipment distributor. [Exp. #175.]

Main Events Online *http://www.mainevents.com* Main Events is one of the largest boxing promotional firms in the world. [Exp. #176.]

Mammothnet *http://mammoth-net.com/* A vacation and holiday resource for condominium rentals in the Mammoth Lakes, CA region. [Exp. #177.]

Maui Island Currents *http://www.islandcurrents.com* A feast of regularly updated information on and culture, dining, activities, and events on the paradise called Maui. [Exp. #176.]

Milan Rugby Official Web Site *http://www.milanrugby.com* The Milan Amatori Rugby S.r.l. official Web site. [Exp. #177.]

Mirimar Cruises *http://www.mirimar.com* Mirimar Cruises of Brisbane, Australia, has a long and proud tradition of service to the people of Brisbane and to the many thousands of visitors who grace our lovely city every year. [Exp. #176.]

Modified *http://www.modified.com* The surf sound of the '90s. [Exp. #177.]

Monterosa Italian Paradise *http://www.monterosa.com* About skiing and vacationing in Monterosa. [Exp. #176.]

Music Mayhem *http://www.geocities.com/Colosseum/Loge/7605/* This site is for alternative and ska music fans! [Exp. #176.]

Never Forget Again! Lifetime Reminder Service *http://home.cwnet.com/remindme* [Exp. #176.]

Nothing But Golf *http://www.NothingButGolf.com* Golf contests, trivia, discussions, jokes, tournaments, schedules, rules, resources, handicaps, Hole-In-One registry, and more. [Exp. #176.]

NRR, Inc. *http://www.newrealm.com* Music production at its finest. [Exp. #175.]

Online Sports League Information And Communication Manager *http://www.sportsdataonline.com* A faster, easier, and more efficient way of managing your sports league. [Exp. #176.]

OnVideo *http://www.cyberpod.com/cyberpod/onvideo.htm* A complete home video guide to current and forthcoming movies released on tape. [Exp. #175.]

Orange County Info *http://www.inorangecounty.com* This site is updated daily and has Orange County specific info on entertainment, arts, news, etc. [Exp. #176.]

Orchid13 *http://www.orchid13.com/* Photography, poetry, weird and unusual, .wav files, David Bowie page. [Exp. #176.]

P&S Records *http://www.psrecords.com* Princess and Saint Records, the Internet's only full-service record company. [Exp. #176.]

PASS Hockey enterprises, Inc. *http://passhockey.com* Hockey skill development. [Exp. #176.]

Perfect Harmony *http://www.madrecords.co.uk* Order our double CD containing a selection of classical organ and choral wedding service music for a church service. [Exp. #177.]

Perry Kurtz Comedy Pages *http://home.earthlink.net/~perrycycle* L.A. comedian Perry Kurtz creates new forms of comedy daily. Now available for all occasions. [Exp. #177.]

Round Flat Records *http://www.roundflat.com* [Exp. #176.]

Royal Vacations, Inc. *http://royalvacations.com* [Exp. #175.]

Salt City Athletics Online *http://www.wingchun.net* Featuring Ling Wood Chuan Wing Chung Kung Fu, Balintawak Arnis, kickboxing, and boxing. [Exp. #176.]

Smartweb In Paris *http://www.smartweb.fr* Guide and virtual visit of Paris, museums, monuments, shopping, and fashion. [Exp. #175.]

SmokiesOnline *http://www.smokiesonline.com* Your Internet resource for planning a Smoky Mountain vacation. [Exp. #176.]

SongHits.com *http://www.songhits.com* Full-length hit songs in streaming RealAudio. [Exp. #176.]

Sound Techniques Television *http://www.users.globalnet.co.uk/~boriswb* British acoustic guitar videos. [Exp. #177.]

Space Adventures Web *http://www.spaceadventures.com* Your space travel agency, bringing space tourism to the world! [Exp. #176.]

Spacecraft Model Kits *http://www.scikits.com* Order Spacecraft Scale Model kits online at low cost! [Exp. #176.]

Star Wars: Episode 1 *http://www.starwars.com/episode-i* Information about the *Star Wars* prequels. Episode I is due in May 1999. [Exp. #176.]

SurfBike: Cycling On Water *http://www.surfbike.ca* A fun, innovative, and environmentally friendly new watersport. [Exp. #176.]

Teams of the World *http://www.islandia.is/totw/* A football (soccer) club database that continues to grow. [Exp. #176.]

Telery *http://www.telery.com/public/default.htm* A place to chat, play games, and have fun with your friends! Live chat, a casino, online games, free email and homepages! [Exp. #176.]

The Hitmen *http://www.rootsworld.com/hitmen/* The Hitmen, a music group. [Exp. #176.]

The Tour-Biz *http://home1.gte.net/tstudios/e-book.html* Travel the world for free! New book, in computer format, explains how to build, sell, and manage a successful tour. [Exp. #175.]

Tom Clancy Politika Web Site *http://www.politika.power-plays.com* Learn more about Tom Clancy's latest paperback book, *Power Plays: Politika*, test your knowledge of Russian history, geography, and culture in the Politika Challenge, and chat with other Tom Clancy fans. [Exp. #176.]

Twinkling Star Casino *http://www.twinklingcasino.com* A complete virtual casino with slot machines, poker, and black jack tables. [Exp. #176.]

Wizard And Glass Web Site *http://www.darktowerIV.com Wizard and Glass* is the fourth volume in Stephen King's epic *Dark Tower* series. [Exp. #176.]

Yanahurco—Ecological Reserve *http://www.yanahurco.com.ec* A private ecological reserve for ecotourism including fishing, horseback riding, bird watching, and camping. The Galapagos of the Andes, 60 miles from Quito, Ecuador. [Exp. #175.]

Yoli Gim *http://www.yoligim.com* Yoli Gim, the first virtual gym, offers an easy way to workout from home and get fit. [Exp. #176.]

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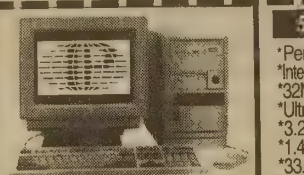

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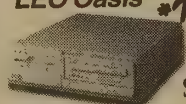

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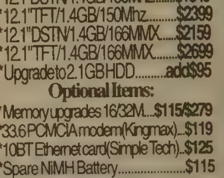

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Marty Gillow
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October 24, 1997

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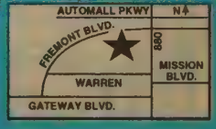
email: sales@acmemicro.com



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For your convenience, here is a list of advertisers by county and city. Please see the advertiser index on page 222 for the page number of the advertisement.

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Alameda
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Albany
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PC Ten
UMiracle MicroSystems

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D Net Computers
Laitron
M.A.C.

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D Net Computers
L.A. Computer Co.
Laitron Computer
PC Doctor
Primetech

Oakland
Domino Computer
Mercury Computers
PC Ten

Pleasanton
Diamond Lane
D Net Computers
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City Com
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Concord
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Computer Applications Co.

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Value Net
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Fresno County

Fresno
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Marin County

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Commax Technologies, Inc.
Computer Renaissance
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IDT Winchip C6
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ITS CD
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Redwood City
Geonet Communications
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Belmont Systems, Inc.

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Hi-Tech USA
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HKG Computers
Kudonet
Legend Computer
LTI Leopard Technology
Microsoft
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PromoX Systems
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Right Tec, Inc.
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USM Systems
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Cyberex Technology Inc., City of Industry
DigitalGuru Bookshop
D-Media Company
Dynatek Infoworld, Inc.
Earthlink Network
Future Computing Solutions
Host Pro
IDT Winchip C6
Input Automation, Torrance
Liuski International, LA
Magitronic, LA
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Net Limited
Sceptre, City of Industry
Spring Internet World 98
ViaNet Communications

Stanislaus County

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Aroma Computer

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HI-TECH SUPER *Multimedia Systems*

PENTIUM II-300 **$2098**
BUSINESS LEASE $63/MONTH

- 64MB RAM (128MB: Add $Call)
- 6.4GB EIDE (8.4GB: Add $100)
- 32X Max CD-ROM
- US Robotics 56.6 Fax Modem (Internet Ready)
- ATI Xpert 8MB AGP or PCI
- Sound Blaster AWE64 Value or Yamaha Sound
- Yamaha Speakers
- TEAC 1.44MB 3.5" Floppy Drive
- Mid Tower Case with Power Supply
- Keytronics Keyboard for Windows 95
- Microsoft Mouse with Pad
- Free Microsoft Windows 95
- Free MS Home Bundle

intel inside

Dual Pentium II-300 (Asus) w/1CPU....$2348
Pentium II-300 (Intel Atlanta) ATX 2098
Pentium II-266 (Intel Atlanta) ATX 1898
Pentium II-233 (Intel Atlanta) ATX 1698
Pentium II-300 (Asus M/B) ATX.....2018
Pentium II-266 (Asus M/B) ATX.....1818
Pentium II-233 (Asus M/B) ATX.....1618
Pentium II-266 (Intel Portland) ATX.....1778
Pentium II-233 (Intel Portland) ATX.....1578
Dual PP-200 (Super Micro) w/1CPU.....1798
MMX-P233/512K (Intel Anchorage) ATX .1558
MMX-P200/512K (Intel Anchorage) ATX .1478
MMX-P166/512K (Intel Anchorage) ATX .1418
MMX-P233/512K (Asus SP97) 1448
MMX-P166/512K (Asus SP97) 1298

Upgrade With System

- Viewsonic PT810/G771 .....$1098/428
- 30-Bit Color Flatbed Scanner.....98
- Windows NT 4.0 10 Client Server.....Best

HI-TECH PROFESSIONAL *Multimedia Systems*

PENTIUM II-266 **$1618**
BUSINESS LEASE $49/MONTH

- 32MB RAM (64MB: Add $Call)
- 4.3GB EIDE (6.4GB: Add $60)
- 32X Max CD-ROM
- 56.6 Internal Fax Modem w/Voice (US Robotics 56.6: +$70) Internet Ready
- Diamond Viper V330 4MB AGP or PCI
- Sound Blaster AWE64 Value or Yamaha Sound
- Yamaha Speakers
- TEAC 1.44MB 3.5" Floppy Drive
- Mid Tower Case with Power Supply
- Keytronics Keyboard for Windows 95
- Microsoft Mouse with Pad
- Free Microsoft Windows 95
- Free MS Home Bundle

intel inside

Pentium II-300 (Intel Atlanta) ATX $1808
Pentium II-266 (Intel Atlanta) ATX 1618
Pentium II-233 (Intel Atlanta) ATX 1408
Pentium II-300 (Super Micro) ATX.....1768
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MMX-P200/256K (Intel Tucson) ATX.....1248
MMX-P166/256K (Intel Tucson) ATX.....1188
MMX-P233/512K (Super Micro).....1268
MMX-P200/512K (Super Micro).....1178
MMX-P166/512K (Super Micro).....1118

Upgrade With System

- NEC A700/A500.....$548/288
- 30-Bit Color Flatbed Scanner.....98
- Windows NT 4.0 Workstation.....Best

HI-TECH VALUE *Multimedia Systems*

MMX-P233 **$998**
BUSINESS LEASE $30/MONTH

- 32MB RAM (64MB: Add $Call)
- 2.0GB EIDE (4.3GB:+$50)
- 24X Max CD-ROM (32X:+$30)
- 56.6 Internal Fax Modem w/voice (US Robotics 56.6: +$70) Internet Ready
- ATI Expression+ 2MB
- Sound Blaster 16 PNP or Yamaha Sound
- 180W Speakers
- TEAC 1.44MB 3.5" Floppy Drive
- Mid Tower Case with Power Supply
- Keytronics Keyboard for Windows 95
- Microsoft Mouse with Pad
- Free Microsoft Windows 95
- Free CD Deluxe Pack

Internet Ready!

Pentium II-300 (Super Micro) ATX.....$1528
Pentium II-266 (Super Micro) ATX.....1328
Pentium II-233 (Super Micro) ATX.....1128
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MMX-P200/512K (Super Micro).....908
MMX-P166/256K (Super Micro).....858
MMX-P233/512K (Asus SP97).....968
MMX-P200/512K (Asus SP97).....878
MMX-P166/512K (Asus SP97).....828
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MMX-P166/512K (Intel Triton TX) 818
AMD K6-233/512K (Intel Triton TX).....888
AMD K6-200/512K (Intel Triton TX).....868
Cyrix MX-P200/512K (Intel Triton TX)....798

Upgrade With System

- 17"/15" SVGA Monitor $328/178
- 30-Bit Color Flatbed Scanner.....98
- Microsoft Office Professional.....168

HI-TECH HOME *Multimedia Systems*

CYRIX MX-P166 **$628**
BUSINESS LEASE $19/MONTH

- 16MB RAM (32MB/64MB: +$30/90)
- 1.2GB EIDE (2.0GB/4.3GB:+$30/$70)
- 16X Max CD-ROM (24X: Add $10)
- 33.6 Internal Fax Modem w/voice (56.6 w/Voice: +$30) Internet Ready
- Diamond 2MB
- PCI IDE with I/O
- 16 Bit 3D Sound Card
- 80W Speakers
- TEAC 1.44MB 3.5" Floppy Drive
- Mid Tower Case with Power Supply
- Keytronics Keyboard for Windows 95
- Free Mouse with Pad
- Free Microsoft Windows 95
- Free CD Deluxe Pack

Internet Ready!

MMX-P233/512K (Asus SP97) $818
MMX-P200/512K (Asus SP97) 768
MMX-P166/512K (Asus SP97) 678
MMX-P233/512K (Intel Triton TX) 808
MMX-P200/512K (Intel Triton TX) 758
MMX-P166/512K (Intel Triton TX) 668
CYRIX MX-P200/512K (Intel Triton TX)..648
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P5-166/256K (Intel Triton VX).....648
P5-150/256K (Intel Triton VX).....638
AMD K5-P166/256K (Intel Triton VX) ...638

Upgrade With System

- 15"/14" SVGA Monitor $178/118
- 30-Bit Color Flatbed Scanner.....98
- Microsoft Office Professional.....168

Why do customers keep buying from HI-TECH USA? Simply because we deliver the best value.

HI-TECH USA SUPER SALE

*BASIC SYSTEM: MOTHERBOARD & CPU, 16MB RAM, IDE WITH I/O, 1.44MB FDD, CASE WITH POWER SUPPLY, AND 104-KEY KEYBOARD.

	MOTHER-BOARD	MOTHER-BOARD WITH CPU	* BASIC SYSTEM W/16MB RAM	* BASIC SYSTEM W/64MB RAM
PENTIUM II-300 (INTEL ATLANTA M/B) ATX	$178	$868	$1038	$1148
PENTIUM II-266 (INTEL ATLANTA M/B) ATX	178	658	828	938
PENTIUM II-233 (INTEL ATLANTA M/B) ATX	178	438	608	718
DUAL PENTIUM II-300 (ASUS P2L97DS) W/1CPU	408	1128	1298	1408
PENTIUM II-300 (ASUS M/B) ATX	178	868	1038	1148
PENTIUM II-266 (ASUS M/B) ATX	178	658	828	938
PENTIUM II-233 (ASUS M/B) ATX	178	438	608	718
PENTIUM II-266 (INTEL PORTLAND M/B) ATX	158	638	808	918
PENTIUM II-233 (INTEL PORTLAND M/B) ATX	158	418	588	698
DUAL PP-200C (SUPER MICRO M/B) w/ 1 CPU	228	678	818	898
PP-200C (INTEL VENUS M/B) ATX	108	568	728	808
PP-180C (INTEL VENUS M/B) ATX	108	278	438	518
MMM-P233/512K (Intel Anchorage M/B) ATX	158	438	598	698
MMM-P200/512K (Intel Anchorage M/B) ATX	158	348	508	608
MMM-P166/512K (Intel Anchorage M/B) ATX	158	268	428	528
MMX-P233/256K (Intel Tucson M/B) ATX	148	428	588	668
MMX-P200/256K (Intel Tucson M/B) ATX	148	338	498	578
MMX-P166/256K (Intel Tucson M/B) ATX	148	248	408	488
MMX-P233/256K (SUPER MICRO M/B)	118	398	518	598
MMX-P200/256K (SUPER MICRO M/B)	118	308	428	508
MMX-P166/256K (SUPER MICRO M/B)	118	228	348	428
MMX-P233/256K (ASUS SP 97) (ASUS TX97: +$70)	88	368	488	568
MMX-P200/256K (ASUS SP 97) (ASUS TX97: +$70)	88	278	398	478
MMX-P166/256K (ASUS SP 97) (ASUS TX97: +$70)	88	198	318	398
MMX-P233/512K (INTEL TRITON TX)	84	358	478	558
MMX-P200/512K (INTEL TRITON TX)	84	268	388	468
MMX-P166/512K (INTEL TRITON TX)	84	188	308	388
AMD K6-P233/512K (INTEL TRITON TX)	84	268	388	468
AMD K6-P200/512K (INTEL TRITON TX)	84	248	368	448
CYRIX MX-P200/512K MMX (INTEL TRITON TX)	84	178	298	378
CYRIX MX-P166/512K MMX (INTEL TRITON TX)	84	158	278	358
P5-150C (INTEL TRITON VX)	64	154	274	354
AMD K5-166C (INTEL TRITON VX)	64	150	270	350
AMD K5-90C (INTEL TRITON VX)	64	124	244	324
486DX4-100C VLB-PCI	58	88	208	288

MONTHLY SPECIALS

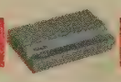
MONITORS SPECIALS

- 14" SVGA Monitor 1024•768 .28.....$119
- Viewsonic PT810 21" 1600•1200 1098

HARD DRIVES SPECIALS

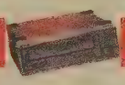
- 1.2GB IDE $104
- 4.3GB IDE 168
- 6.4GB IDE 34

MODEMS/FAXES SPECIAL



- 56.6 Fax Modem w/Voice Internal.....$60

CD-ROM DRIVE SPECIALS



- 24-Speed CD-ROM $59
- 32-Speed CD-ROM 84

HI-TECH STARTER MULTIMEDIA SYSTEM

- Cyrix 6X86 MX-PR 200 Processor
- 16MB System Memory
- 512K Pipelined Cache
- 1.2GB IDE Hard Drive
- 24X Max CD-ROM Drive
- 16 Bit 3D Sound Card
- 33.6K bps Fax/modem w/Voice
- 1MB SVGA Card
- Mini Tower Case with Power Supply
- Keyboard for Windows 95
- 80 Watt Speakers and Mouse
- Microsoft Windows 95 Pre-installed
- Monitor Sold Separately

Internet Ready!

200MHZ $568

BUSINESS LEASE: $17/MONTH

See Next Page for All of Our Upgrade Prices

HI-TECH DELUXE MULTIMEDIA SYSTEM

- 166MHz Intel Pentium Processor w/MMX Technology
- 32MB Memory
- 512K Pipelined Cache
- 2.1GB Hard Drive
- 24X Max CD-ROM
- 33.6K Fax/Modem w/Voice
- 16 Bit 3D Sound Card
- 1MB SVGA Card
- 80W Speakers
- Mini Tower Case w/Power Supply
- MS Windows 95 Pre-installed
- Monitor Sold Separately

intel inside

Internet Ready!

MMX-166 $648

BUSINESS LEASE: $20/MONTH

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HI-TECH DREAM MULTIMEDIA SYSTEM

- 233MHz Intel Pentium Processor w/MMX Technology
- 32MB Memory
- 512K Pipelined Cache
- 4.3GB Hard Drive
- 24X Max CD-ROM
- 33.6K Fax/Modem w/Voice
- Sound Blaster 16 PNP
- 1MB SVGA Card
- Yamaha M7 Speakers
- Mini Tower Case w/Power Supply
- MS Windows 95 Pre-installed
- Monitor Sold Separately

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Internet Ready!

MMX-233 $898

BUSINESS LEASE: $27/MONTH

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HI-TECH POWER MULTIMEDIA SYSTEM

- 233MHz Intel Pentium II Processor featuring MMX Technology
- 32MB Memory
- 512K Pipelined Cache
- 6.4GB Hard Drive
- 24X Max CD-ROM
- 56K Fax/Modem
- Sound Blaster AWE 64 Value
- ATI 3D Xpression+ w/TV 2MB
- Yamaha M15 Speakers
- ATX Mid Tower Case w/PS
- MS Windows 95 Pre-installed
- Monitor Sold Separately

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Internet Ready!

Pentium II-233 $1188

BUSINESS LEASE: $36/MONTH

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1. One year parts and labor warranty on systems.
2. Knowledgeable technical support engineers in service.
3. Prices and availability subject to change w/o notice.
4. Shipping, insurance and COD charges are extra and non-refundable. Prices reflect cash discounts.
5. Return shipping must be insured, prepaid and bearing an RMA# on the shipping label.
6. Defective items replaced or repaired at our discretion.
7. No responsible for typos.
8. All returns subject to 15% restocking fee and cover only Hi-Tech USA brand computers; excludes peripherals, software and notebook computers. No refunds after 30 days.
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10. Purchase orders are welcomed and subject to approval

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Mini Tower Case w/200W Power Supply 22
Desktop AT Case w/200W Power Supply 29
Medium Tower Case w/230W Power Supply 34
Full Tower Case w/250W Power Supply 47
ATX Case w/Power Supply (Mini / Full) ..... 58 / 76

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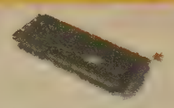

IDE 2FD/2HD with 2S/1P/1G $11

adaptec

1520 (SCSI) $64
2940 PCI (SCSI) 144
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2940UW PCI (SCSI) 175

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DTC 2280E ISA with 16550 UART Chip $19

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WESTERN DIGITAL

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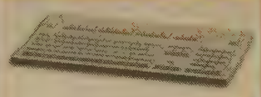

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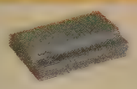

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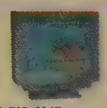

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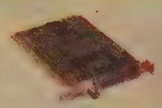

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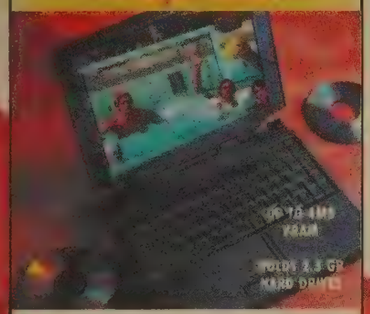

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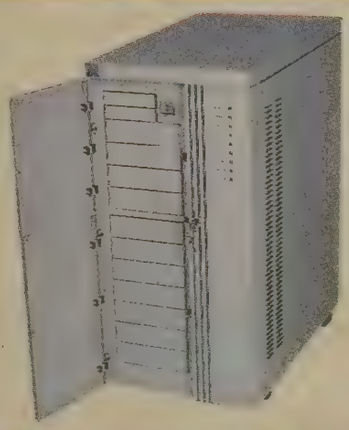

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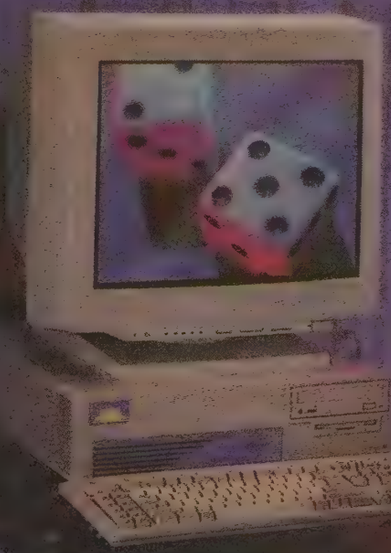

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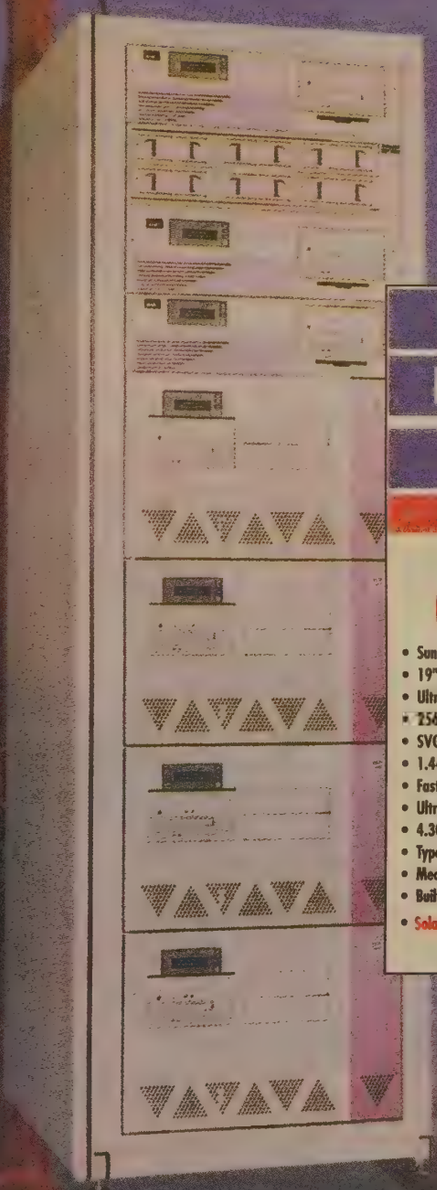

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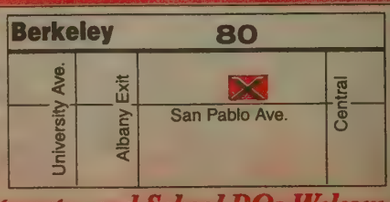

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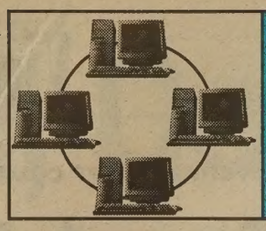

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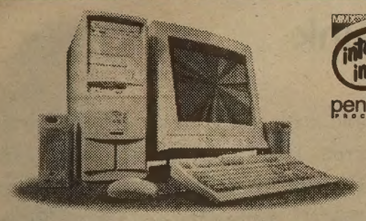

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The Great Foreboding

Or, A Last Look At The Macintosh, I Think

***So I** went to the Macworld Expo to see who was bailing out. Answer: everyone, kind of. The atmosphere was gloomy to say the least, with die-hards rationalizing their position and keeping the faith. Jobs livened things up with his keynote, and a slew of Maco-philes were bragging about the glories of Office 98 and how the Mac will get it first. Needless to say these folk have not been keeping up. Anyone knows now that the first group to get Office 98 will be sorry! Can you spell "bugs and incompatibility?" Most PC users were saying "better them than us!"*

After the show I wandered home to do some file archiving and ran into this column from 1992 which predicted this decline way back then. I've noticed over the years that predicting gloom always pays off because it eventually happens. While being five or six years ahead of the event may be excessive, it does show some insight. The following missive was written five and a half years ago for the now defunct MacUser *(reprinted by permission of author, me):*

* * * * *

It's time to face the fact: the Mac is at the end of its lifecycle. It's become a dead-end platform just as the Apple II became a dead-end platform in 1984 when the Mac was introduced. The newest same-old Macs to be sold in Sears prove that the end is near.

The basic Macintosh is almost nine years old. If you count the Lisa as part of its evolution then it's nearly a decade old. This is old for an architecture that hasn't changed much except for the addition of a needed bus and some multitasking capability.

Sure the chips are faster, but Motorola has been unable to keep up the torrid pace set by Intel and we'll never see a 68060, that's for sure! So even the CPU is a dead-end as Apple will move to RISC and a new design. The death knell for the Mac will be symbolized by some sort of tribute such as the April 1984 "APPLE II FOREVER" bash Apple threw when it rolled out the Apple IIc right in the face of the Mac juggernaut. When you see a Macintosh Forever party, you'll know the Mac is dead.

The big question is what will Apple call the next generation computer? The Mac III? Or will the Mac moniker be dropped altogether or just left to languish like the Apple II? I suspect it will languish as die-hard Mac owners moan and groan, like old Apple II users used to do.

Whatever happens, now is the time for users to take action and help name the new platform. I'm sure Apple is consulting with naming experts, but these guys do not have the collective brain-power of the Mac user community. I have a few ideas that may trigger some of your own. Send ideas to John Sculley.

Next-Generation Names

Naming conventions fall into five broad categories: vegetable, animal, mineral (remember the VAM hair tonic?), mathematical and conceptual.

The name Apple itself comes from the vegetable category. This category broadly refers to any non-mobile life form, except for SYSOPS. The Macintosh, the Pineapple, the Fern. I'd include mushrooms and fungi in this category too. The Pinecone II might be a good name for a computer. Or the Seaweed. How about the Yucca or the Onion Computer? I like the Cactus Computer. Get the point? I suspect Apple may name the next machine after still another breed of apple fruit, such as the Roma, the Gravenstein or the Golden Delicious. How about Winesap or Crabapple?

Onward to the animal category. This was once used by car makers to excess: Falcon, Mustang, Bronco, Cougar, Panther, Stingray. The computer makers haven't done much to exploit these possibilities. There are a lot of potential names in this category. The buffalo, canary, pig, dog, cockroach, blowfish, horsefly. I think the Apple Carp would be a good name. How about hybrid names such as flank steak or corn dog? How about a radical new name such as the Apple Boneless Chicken Computer?

Mineral is the next category. Rock, dust, sand, salt water, cardboard, pyrites, gold, silver, hydrogen. Here the possibilities are endless, especially if we think in terms of macros such as "socket set" or "crock of crap." Now I guarantee that if Apple names its next computer the Apple Crock of Crap it would get all the free publicity it would ever need. Every newspaper and magazine would analyze the idea to death wondering why a great marketing company like Apple would do such a thing. "Looking for a new computer? Buy an Apple Crock of Crap!" Copycats would follow with screwball names for their machines too. Scatological references would be in vogue as we'd see the Compaq Pile O' Dung and the IBM Bat Guano/2.

The mathematical names come next. They are usually just alphanumeric designations such as the new Mac 200 and 400 machines. German car companies seem preoccupied with this as the accepted way to name cars: 750il, 300D, 190E, 325i, 911, 914, 939, etc., etc. Some cars like to use a math formula such as the 2+2 sports car. (Why they just don't call it a "4" mystifies me.) All the chip makers such as Intel and Motorola have been caught up in this concept from the first 4004 microprocessor through the 68040 and the 486DX2. These are probably the ultimate names in nerdland, but let's hope Apple doesn't go in this direction.

Finally there is the high concept. A name like the Oldsmobile falls into this category. Concept names for a computer might be words like sunset, highjump, dreamboat. More complex concepts such as "pie-in-the-face" or "rotten glass of swill" add new dimensions to this category. Apple could, for example, call its computer the Bust a Gut Laughing Computer. What about being descriptive with a name like Oooey-GUI Computer?

I think a macho name such as the Butt-Kicker would be perfect for a computer. "Falling behind in your work? Spreadsheets taking forever to recalc? Try a Butt-Kicker from Apple!!" Very cool name, if you ask me.

Whatever Sculley and company does let's hope it's not going to use the code name like it did with the Macintosh. Then we'd be using the Apple Pink! How about Pinkintosh? I think not. You'd better get those suggestions in FAST!

* * * * *

Needless to say I was a lot funnier six years ago and it's too late for the suggestions. Times change. ■

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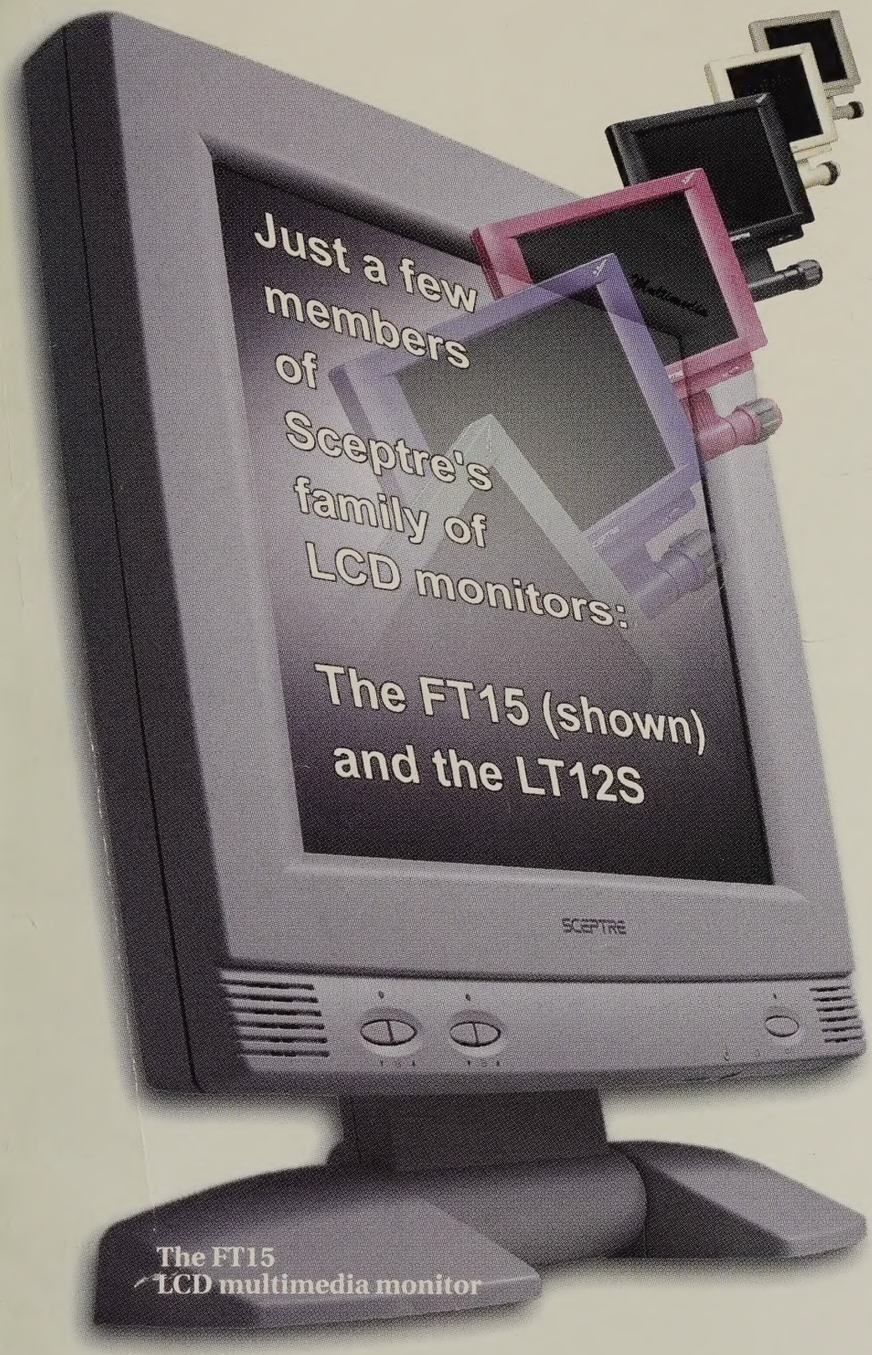
Been There, Done That!



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